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THE

AMERICAN CYCLOPÆDIA.

VOL. XVI.

TROMBONE—ZYMOSIS.

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THE

AMERICAN CYCLOPÆDIA:

A

Popular Dictionary

OF

GENERAL KNOWLEDGE.

EDITED BY
GEORGE RIPLEY AND CHARLES A. DANA.

WITH SUPPLEMENT.

VOLUME XVI.
TROMBONE—ZYMOSIS.

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TROMBONE, a brass wind instrument, supposed to be identical with the ancient sackbut, which constitutes one form of the trumpet. By means of sliding tubes great depth and power of tone are produced, and the instrument is capable of splendid effect. Trombones are of three kinds, alto, tenor, and bass; the first having a compass from C, the second space in the bass, to G, an octave above the treble clef; the second from B, the second line in the bass, to A, the second space in the treble; and the third from C, an octave below the second space in the bass, to G, the second line in the treble.

TROMP. I. Maarten Harpertzoon van, a Dutch admiral, born in Briel in 1597, killed in battle, July 31 (N. S., Aug. 10), 1653. In his boyhood he was captured by the English in a battle off the Guinea coast, in which his father was killed. Subsequently he was prominent on various occasions, especially under Admiral Heijn. In 1639, as admiral of Holland, he inflicted great damage upon the Spanish fleet near Gravelines, and in October he gained a most decisive victory over a powerful Spanish squadron under Oquendo in the Downs, for which he was made a noble of France. Against the English fleet in 1652 he was at first unsuccessful in the Downs, and was superseded by De Ruyter, but was soon reinstated as chief commander. He signally defeated Blake near the Goodwin Sands, Nov. 29, but was intercepted by him off Portland island, Feb. 18, 1653, suffered a heavy loss, and retreated. He was killed in an encounter off the Dutch coast with the English fleet under Monk, and was buried with great splendor at Delft. **II. Cornelis van,** a Dutch admiral, son of the preceding, born in Rotterdam, Sept. 9, 1629, died in Amsterdam, May 29, 1691. He early operated against the African pirates and against the English in the Mediterranean, and when 21 years old was made vice admiral. From 1656 to 1662 he lived in retirement. In 1665, when the Dutch fleet under Admiral Opdam was beaten by the English off Solebay, Van Tromp conducted a masterly retreat. He was appointed commander-in-chief in the absence of De Ruyter, and under him he displayed great valor in the encounter with the English in the Downs in June, 1666; but on July 25 (N. S., Aug. 4) he was cut off from the main squadron, and was unable to come to the relief of De Ruyter, who accordingly insisted upon his removal. He was reinstated in 1673, during the war with the allied French and English, in which he gained new laurels. After the restoration of peace with England in 1675 he was cordially received in that country, and Charles II. made him a baronet. On De Ruyter's death in 1676 he succeeded him in the highest naval rank, but afterward served for some time with great distinction under the Danish government.

TROMSÖ. I. The northernmost stift or diocese of Norway, bordering on the Arctic and Atlantic oceans; area, 42,687 sq. m.; pop. in 1865, 155,335. It is divided into the bailiwicks of Nordland, Tromsö, and Finmark, and includes the Loffoden islands, celebrated for magnificent scenery and extensive cod and herring fisheries. (See Loffoden.) There is little agriculture, the main means of subsistence being derived from fisheries. **II.** A town, capital of the diocese, on an island in the sound of Tromsö, between the island of Kvalö and the mainland; lat. 69° 38′ N., lon. 19° E.; pop. about 4,000. It is the seat of a governor, and has several schools, a church, a Lappish printing office, and a hospital chiefly for lepers. The seat of the bishop has been removed to Alstahoug. The town was founded in 1794, and has an active shipping trade and an excellent harbor sheltered by mountains. Many vessels belonging here are engaged in the walrus fishery at Nova Zembla and Spitzbergen.

TRONDHJEM, or Throndhjem. See Drontheim.

TROOPIAL (Fr. *troupiale*), a name given to several species of the *icterinæ* and *agelainæ*, subfamilies of American conirostral birds, in some respects resembling the starlings of the old world, and in others coming near the finches; they have the nine primaries of the finches, but the bill is larger, straight, the base without bristles, and the tip without a notch. The name is derived from their habit of associating in large troops. In the *icterinæ* the bill is generally longer than the head, straight and sharp-pointed; wings long and pointed, and tail usually wedge-shaped; toes moderate and formed for perching. The prevailing colors are yellow or orange and black; they are generally called orioles in North America, and a well known species has been described under Baltimore Bird; hang-nest is a name derived from their habit of suspending the nest from the extremity of slender branches.—The common troopial (*icterus vulgaris*, Daud.) is about 10 in. long, with a straight bill; back and abdomen yellow; head, neck all round, breast, and tail black; a white band on the wings; feathers of throat elongated and pointed; it is a native of northern South America and the West Indies, sometimes coming to the southern United States. They move in flocks, sometimes mingled with other species, and show a great partiality to the neighborhood of man; they are excellent fliers, and equally at home on the ground or in trees; they are loquacious at all seasons; their flesh is excellent. There are several other species in Mexico, Texas, and Central America. The orchard troopial (*I. spurius*, Bonap.) very much resembles the Baltimore oriole in the pattern of its colors, the orange red of the latter being replaced by dark chestnut, the tail entirely black and more graduated, and the bill slenderer and more curved. —The only other genus of the *icterinæ* which can be mentioned here is *cassicus* (Cuv.), so called from *cassis*, a helmet, the bill rising on the forehead in a crescent shape; nostrils basal, naked, pierced in the substance of the bill; third and fourth quills longest, and tail long and graduated; tarsi and toes strongly scaled. There are about 20 species, peculiar to tropical America, living in the forests and also near human habitations, in vast troops; they eat fruits, berries, insects, and larvæ. The nest is most ingeniously woven by both sexes, made of fibres and dried grasses, of a cylindrical or gourd-like form, and sometimes 3 ft. long; the lower part is hemispherical, the opening near the top, and the fabric suspended from the ends of slender twigs of high trees, out of the reach of monkeys and snakes; many nests are made on one tree, and sometimes those of different species together. They are docile in captivity, and learn to whistle and to articulate words; they are generally black, contrasted with bright yellow, especially toward the tail.—In the subfamily *agelainæ* the bill is stout, short, conical, nearly straight, and sharp-pointed; tarsi as long as the middle toe; toes long and slender, and claws long and curved. Some of the birds of this subfamily have been described under Blackbird, Bobolink, and Cow Bird, species respectively of the genera *agelaius* (Vieill.), *dolichonyx* (Swains.), and *molothrus* (Swains.).

Common Troopial (Icterus vulgaris).

Cassican (Cassicus).

TROOST, Gerard, an American chemist and geologist, born in Bois-le-Duc, Holland, March 15, 1776, died in Nashville, Tenn., Aug. 14, 1850. He was educated at the university of Leyden, and in 1809 was sent by Louis Bonaparte, king of Holland, on a tour of scientific observation in Java. The capture of the vessel by a privateer interrupted this undertaking, and in 1810 he settled in Philadelphia. He was one of the founders of the academy of natural history, and its first president from 1812 to 1817. In 1814 he established the first alum works in the United States; and in 1825, having held for a short time the professorship of chemistry in the college of pharmacy in Philadelphia, he joined Robert Owen's community at New Harmony. In 1828 he was appointed professor of chemistry, mineralogy, and geology in the university of Nashville, and in 1831 geologist of the state of Tennessee. He published reports on the geology of Tennessee, and memoirs on geology and mineralogy.

TROPÆOLUM. See Nasturtium.

TROPIC BIRD (*phaëton*, Linn.), a genus of web-footed oceanic birds, constituting the family *phaëtonidæ*. They have a long, strong, pointed bill, broad at the base, slightly curved, without nail and the edges finely serrated;

nostrils at base of bill, lateral, and pervious; face covered with feathers; wings long and pointed, the first primary the longest; tarsi short and strong, feet small, and toes fully webbed; hind toe small; tail with two long, straw-like feathers, whence the French name *paille en queue* or straw-tail; sailors call them boatswain bird and marlinspike. In habits and appearance they come near the gulls and terns; they are chiefly confined to the tropics. Their powers of flight are great, and they are usually seen at considerable distances from land; they live almost entirely on the wing, and, when they do not return to the distant shore to roost, rest upon the surface of the ocean; they are excellent swimmers. The food consists of fish and other marine animals, which they dart upon from a great height; they are fond of following the shoals of flying fish, seizing them as they emerge from the sea. They are not larger in the body than a pigeon, though longer; they congregate in considerable numbers at their breeding places, on rocky shores and desert islands, placing the nest on the ground or in holes in trees; the eggs are two; their flesh is fishy and tough. The common tropic bird (*P. æthereus*, Linn.) is about 30 in. long and 38 in. in alar extent; it is of a satiny white, the wings banded with black, and the head, back, and wings tinged with cream color or light pink; first five primaries black on the outer webs, and the shafts of the long tail feathers black to near the end, where they are white; a black mark over eyes to occiput; bill orange red and iris brown; tarsus and toes yellow at base, webs and claws black. It sometimes comes near the Florida coast, but is usually seen in the tropical Atlantic far from land. The long tail feathers of the *P. phœnicurus* (Gmel.), inhabiting the tropical Pacific, are bright red, and are used as ornaments by the South sea islanders.

Tropic Bird (Phaëton æthereus).

TROPICS (Gr. τροπή, a turning), in astronomy, two circles parallel to the equator, at such distance from it as is equal to the greatest recession of the sun from it toward the poles, or to the sun's greatest declination. That in the northern hemisphere is called the tropic of Cancer, and that in the southern the tropic of Capricorn, from their touching the ecliptic in the first points of those signs. (See Cancer, and Capricorn.) It is between the tropics that the sun's path is circumscribed, its annual movement being from one to the other and back again in the ecliptic.—In geography, the tropics, also known as that of Cancer and that of Capricorn, are the two parallels of latitude (about 23° 28′ N. and S.) over which the sun is vertical at the solstices. (See Solstice.)

TROPLONG, Raymond Théodore, a French jurist, born at St. Gaudens, Haute-Garonne, Oct. 8, 1795, died in Paris, March 2, 1869. He early held important judicial offices. In 1846 he was made a peer, in 1848 first president of the court of Paris, and in 1852 of the court of cassation. In 1852 he was made a senator, and in 1854 president of the senate. His principal work, *Le Code civil expliqué* (28 vols., 1833–'58), is a collection of treatises in continuation of Toullier's *Commentaire du Code civil*, many of which have been published separately.

TROPPAU, a city and the capital of Austrian Silesia, on the Oppa, 35 m. N. E. of Olmütz; pop. in 1870, 16,608. It has six Catholic churches, a palace, a gymnasium with a large library, a museum, and manufactories of beet sugar, flax, and cloth. A congress of sovereigns was held here from Oct. 20 to Dec. 20, 1820, preliminary to that of Laybach.—The former duchy of Troppau, having been divided into the principalities of Troppau and Jägerndorf, was partly annexed to Prussia in Frederick the Great's conquest of Silesia, and forms the S. W. part of Prussian Silesia, with Leobschütz, of the Jägerndorf division, as capital. The territory which remained to Austria after the peace of 1763 constitutes most of the N. part of Austrian Silesia, comprising, besides the capital, Jägerndorf and other manufacturing towns.

TROUBADOURS. See Provençal Language and Literature.

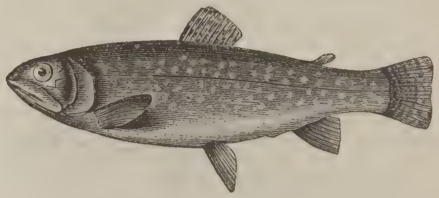
TROUP, a W. county of Georgia, bordering on Alabama, and intersected by the Chattahoochee river; area, about 370 sq. m.; pop. in 1870, 17,632, of whom 11,224 were colored. The surface is hilly and the soil generally fertile. It is intersected by the Atlanta and West Point railroad. The chief productions in 1870 were 26,645 bushels of wheat, 162,946 of Indian corn, 34,514 of oats, 29,290 of sweet potatoes, and 9,963 bales of cotton. There were 680 horses, 1,698 mules and asses, 1,519 milch cows, 3,027 other cattle, 1,203 sheep, and 6,516 swine; 1 manufactory of boots and shoes, 2 of cotton goods, 1 of iron castings, 2 of machinery, and 3 saw mills. Capital, La Grange.

TROUP, George McIntosh, an American statesman, born on the Tombigbee river, Sept. 8, 1780, died in Laurens co., Ga., May 3, 1856. He graduated at Princeton college in 1797, was admitted to the bar, and at the age of 21 was elected to the state legislature. Between 1807 and 1815 he was a representative in congress from Georgia, and in 1816 was elected a United States senator. From 1823 to 1827 he was governor of the state, and in 1829 was a second time elected to the United States senate, from which he retired before the expiration of his term, on account of ill health. He was one of the most earnest and able of the advocates of state sovereignty. His life was written by E. J. Harden (Savannah, 1859).

TROUSDALE, a N. county of Middle Tennessee, intersected in the S. E. by the Cumberland river; area, about 110 sq. m. It has been formed since the census of 1870 from portions of Macon, Smith, Sumner, and Wilson counties. The greater part of the surface is made up of valleys separated by ridges, the soil of both being productive. The timber consists of poplar, white oak, walnut, &c., but is not abundant. Blue grass is abundant. The staples are corn, wheat, tobacco, and hay. Capital, Hartsville.

TROUSSEAU, Armand, a French physician, born in Tours, Oct. 14, 1801, died June 23, 1867. He graduated in medicine at Paris in 1825. In 1828 he was sent by government to investigate endemic and epidemic diseases prevalent in the central departments of France, and the yellow fever at Gibraltar. In 1831 he was appointed hospital physician; in 1837 he received the grand prize of the academy of medicine for a treatise on *phthisis laryngea;* and in 1839 he was appointed professor of therapeutics and materia medica in the faculty of medicine. He was prominent in introducing and establishing the practice of tracheotomy in croup and *paracentesis thoracis* in cases of dangerous or long continued pleuritic effusion. His most important works are *Traité élémentaire de thérapeutique et de matière médicale* (Paris, 1836; 8th ed., 2 vols., 1867), which was translated into English, Spanish, and Italian, and *Nouvelles recherches sur la trachéotomie dans la période extrême du croup* (1851).

TROUT, a name popularly restricted to the species of the salmon family inhabiting exclusively or principally fresh water, and embracing members of the three subgenera of the old genus *salmo* made by Valenciennes, viz., *salmo*, *fario*, and *salar;* the family characters have been given under SALMON. The salmon trouts belong to the genus *fario* (Val.), having one row of teeth on the vomer, the true salmons having the palate smooth; the species are so called from the redness of the flesh, but all the trouts have this color at some epoch of their lives, depending probably on their food. The salmon trout of Europe (*F. argenteus*, Val.; *salmo trutta*, Linn.), called also white or sea trout, is found in the larger lakes and rivers of that continent; it varies considerably in color, like all of the family, according to the character of the water and the quality of the food; it is greenish gray or bluish black above, lighter on the sides, and silvery white below, with a few black spots above the lateral line; it attains a length of 2 to 2½ ft., and, being abundant in the markets of London and Paris, is next in value to the salmon, which it resembles in habits. The so-called sea trout of the gulf of St. Lawrence (*salmo immaculatus*, H. R. Storer) has the flesh of a fine pink color and superior flavor; the color is sea-green above, lower parts and the fins white; it rarely exceeds a weight of 7 lbs.; it probably belongs to the genus *fario.* There are several species called salmon trout in lakes shut off from the sea and near the mouths of the rivers of Maine. The spots of trout resist the action of heat and even of alcohol for a long time.—The common brook or speckled trout of North America (*salmo fontinalis*, Mitch.) is from 8 to 20 in. long, pale brownish above with darker reticulated markings; sides lighter, with numerous circular yellow spots, many with a bright red spot in the centre; white or yellowish white below; the first ray of pectorals, ventrals, and anal edged with white and black, with the rest of these fins reddish. It is found abundantly in the streams of the British provinces, the New England, middle, and western states, and is everywhere highly esteemed as food; it is rarely taken weighing more than 1½ lb.; the markings vary considerably according to locality and season; in New Brunswick and Nova Scotia it descends to the sea when it can; it is the same species from Labrador to Pennsylvania and Ohio. It is a great favorite with anglers; it is taken by the hook and line baited with a minnow, shrimp, worm, or artificial fly; in narrow streams, just before the spawning season, when it is little inclined to bite, it may be caught by titillation, by passing the hand carefully under the tail, and, as the tickling is gently performed, slowly moving it toward the head, until by a sudden grasp it is seized and landed.—In the genus *salmo* belongs also the char of the British and Swiss lakes (*S. umbla*, Linn.), usually 9 to 12 in. long, but sometimes 18 or 20 in.; it is umber-brown above, the sides lighter with numerous red spots, the lower parts and fins reddish orange; it varies like all other trouts, and occasionally attains a larger size than the above; it frequents the deep part of the lakes, feeds chiefly at night, and affords but little sport to the angler. Its American representative is the *S. oquassa* (Girard) of the great lakes of Maine.—In the genus *salar* (Val.) there are two rows of teeth on the vomer. The common European brook trout (*salar fário*, Val.) is usually 10 to 14 in. long, though sometimes considerably larger, even to a weight



Speckled Trout (Salmo fontinalis).

of 15 lbs.; it is shorter and stouter than the salmon, yellowish brown above, passing to yellow on the sides, and silvery below, the back spotted with reddish brown and the sides with bright red; the young are transversely banded; deformed specimens are frequently seen. The colors are brightest in rapid streams with rocky or gravelly bottom; the flavor is finest from the end of May to the end of September, soon after which the spawning season begins. This species is highly prized by anglers, and especially fly-fishers. As it is fond of swiftly running waters, and swims almost always against the current, the bait must be thrown up stream. The eggs are deposited in nests or holes in the sand, as with the salmon. The gray trout of the North American great lakes, from the northern United States to the Arctic ocean, is the *S. namaycush* of Valenciennes, and the *salmo amethystus* of Mitchill and De Kay; it is called togue by the Canadian lumbermen, and from its size and voracity the tyrant of the lakes; it is greenish ashy above with yellowish gray spots, and below white with bluish reflections; the average weight is 12 to 20 lbs., though it attains sometimes more than twice this size. The siskiwit (*S. siscowet*, Ag.) belongs to the genus *salar* (Val.); it is of large size, stout and thick, of a rich flavor, but so fat as to be almost unfit for food; for description and figure see Agassiz's "Lake Superior," p. 333 (8vo, Boston, 1850).—The trout, both in Europe and America, is a favorite subject for pisciculture, from the ease with which artificial fecundation of the eggs can be effected; but it has as yet been practised here on a small scale only; the labor and expense attending a large vivarium of trout are very small, while the remuneration may be made very large. For an illustrated account of the manner of hatching trout artificially, see "American Naturalist," vol. iii., p. 202, and vol. iv., p. 601 (1870).

TROUVILLE, a French watering place, in the department of Calvados, Normandy, prettily situated at the foot of a hill near a forest, at the mouth of the Touques in the English channel, 107 m. W. N. W. of Paris; pop. in 1872, 5,761. Until recently it was a small fishing village. The bathing season begins in June, and lasts till the middle of October. Deauville, a rival watering place, is on the opposite bank.

TROVER (Fr. *trouver*, to find), the name of an action at law in common use in England and in the United States, to determine the ownership of property. The plaintiff declares, in substance, that he was lawfully possessed of a certain article on a certain day, and lost the same; that it came into the possession of the defendant by finding; and that the defendant has refused to deliver it to the plaintiff, and has converted it to his own use. This action is one form of trespass on the case. (See TRESPASS.) In the distant age when it was first used, the declaration may have narrated accurately the facts of the case; but for a long time the losing and finding have been regarded as mere legal fictions, which the defendant is not at liberty to deny. The action is maintainable: 1, where the property in question is a personal chattel; 2, where the plaintiff had a general or special property in the thing with a right of possession; 3, where the defendant has wrongfully converted the thing to his own use, which conversion may be proved by his wrongful taking of it, or his wrongful detention of it, or his wrongful use or misuse of it. The action demands not the thing itself, but damages for the wrongful conversion; and if the plaintiff recovers, the damages should be measured by the value of the thing at the time of the conversion, with interest, and the judgment is for these damages and costs.

TROWBRIDGE, John Townsend, an American author, born in Ogden, Monroe co., N. Y., Sept. 18, 1827. At the age of 20 he went to Boston, connected himself with the public press, and became known as a writer of popular stories. With Lucy Larcom he edited "Our Young Folks" till January, 1874. He has published "Father Brighthopes, or an Old Clergyman's Vacation," "Burr Cliff, its Sunshine and its Clouds," and "Hearts and Faces" (1853); "Martin Merrivale, his X Mark" (1854); "Iron Thorpe" (1855); "Neighbor Jackwood" (1857); "The Old Battle Ground" (1859); "The Drummer Boy;" "The Vagabonds" (1863, and with other poems, 1869); "Cudjo's Cave" (1864); "The Three Scouts" (1865); "Lucy Arlyn," "Coupon Bonds," and "The South: a Tour of its Battle Fields and Ruined Cities" (1866); "Neighbors' Wives" (1867); "The Story of Columbus" (1869); "Laurence's Adventures" (1870); "Jack Hazard and his Fortunes" (1871); "A Chance for Himself" (1872); "Doing his Best" (1873); "Fast Friends" (1874); and "The Young Surveyor" (1875).

TROY (TROJA), the name of an ancient city in the N. W. part of Asia Minor, applied also to its territory. The latter, generally known as the Troad (Troas), comprised for a time the coast lands on the Propontis, Hellespont, Ægean sea, and Adramyttian gulf, as far E. as the river Rhodius, the Granicus, or even the Æsepus, but later, according to Strabo, only the region from the promontory of Lectum to the Hellespont. The city of Troy, also called Ilium (Ἴλιον), according to the Homeric poems, was situated at the foot of Mt. Ida, far enough from the sea to allow of the movements of two large armies, and in a position which commanded a view of the plain before it and of a smaller one behind it. In front of it were two rivers, the Simoïs and Scamander, flowing parallel for some distance, which united and emptied into the Hellespont, between the promontories of Sigeum and Rhœteum. This city, the existence of which is attested only by the traditions of the Trojan war, must be distinguished from the Ilium of history, which, according to Strabo, was founded about the beginning of the 7th century B. C. The former was afterward designated as Old Ilium, and the latter as New Ilium. The name was shared also by a third place in the same region, the *χώμη 'Ιλιέων*, "the village of the Ilians," about 3 m. from New Ilium, which claimed to occupy the site of the original Ilium.—According to the legend, Dardanus was the mythical ancestor of the Trojan kings, who were of the Teucrian race, closely connected with the Mysian. (See Mysia.) Dardanus's son was Erichthonius, who was succeeded by Tros, and he by Ilus, who founded in the plain of Troy the city of Ilium. Ilus was succeeded by Laomedon, and to him Neptune and Apollo became temporarily subject by command of Jupiter. The former built the walls of the city, and the latter took care of the herds; but when their time of service had expired, Laomedon treacherously refused to pay what was due them. In revenge Neptune sent a sea monster to kill the Trojans and ravage their fields, and the treacherous king in consequence made a public offer of the immortal horses given by Jupiter to Tros to any one who could rid the land of the monster. The oracle declared that a virgin of noble blood must be given up, and the lot fell on Hesione, Laomedon's own daughter; but she was rescued by Hercules, who came at this time and killed the monster. Laomedon gave the hero mortal horses, and the latter, indignant at this perfidy, collected six ships, attacked and captured Troy, killed Laomedon, and placed on the throne Priam, who alone of Laomedon's sons had remonstrated against the perfidy of his father. To him were born by his wife Hecuba a large number of children, one of whom, Paris, brought on by his abduction of Helen, the wife of Menelaus, the memorable siege of Troy. To revenge this outrage, the Greeks spent ten years in the collection of a vast armament, and at the end of that time a fleet of 1,186 ships, containing more than 100,000 men, was assembled at Aulis in Bœotia, and placed under the command of Agamemnon. The Trojans and their allies were driven within the walls of their city, and nine years were spent by the Grecian host in the reduction of the neighboring towns. But the gods now brought on the quarrel between Agamemnon and Achilles, which proved so disastrous to the Greeks, and with which the narrative of the siege in the Iliad opens. Among the principal Greek heroes in the struggle, besides Agamemnon, Menelaus, and Achilles, were Ulysses, Ajax the son of Telamon, Diomedes, Patroclus, and Palamedes; and among the bravest defenders of Troy, Hector, Sarpedon, and Æneas. The valor of Achilles, who slew Hector in revenge for the death of Patroclus, and the cunning of Ulysses finally prevailed, with the aid of Juno, Minerva, and other divinities hostile to the Trojans; and after a siege of ten years (generally placed at about 1194–1184 B. C.), Troy was utterly destroyed, Æneas and Antenor alone escaping with their families.—The opinions of the principal authorities on the question whether the destruction of Troy was a historical event have been given in the article Homer; we shall confine ourselves here to reviewing the various attempts made to identify the site of Old Ilium, on the supposition that it once existed. Though it was the popular belief of antiquity that New Ilium had been built on the ruins of the Old, yet that town never rose to importance, and Demetrius of Scepsis and Hestiæa of Alexandria maintained that the remains of Priam's Ilium were to be found rather in the "village of the Ilians," which opinion was supported also by Strabo. All were agreed that the ancient city stood on the right bank of the Scamander, the modern Mendereh. New Ilium was on the Scamander near the junction of the Simoïs, which is supposed to be represented by the Gumbrek or Dumbrek, about 12 m. long, now entering the Hellespont by a separate channel. The ruins of New Ilium are near the village of Hissarlik, on a small hill. The ancient historians Hellanicus, Xenophon, and Arrian identified this hill as the citadel of Pergamus; and Xerxes and Alexander, and the Roman consuls and emperors, here offered hecatombs to the Minerva of Ilium and the Trojan heroes. But Horace and Lucan, as well as other Roman authors, were firmly convinced that the knowledge of the site of Homeric Troy had entirely perished. In 1785 Le Chevalier discovered on the left bank of the Mendereh, near the village of Bunarbashi, about 5 m. S. of New Ilium, a hot and a cold spring or fountain, which he supposed to be those mentioned in the Iliad. Beyond these springs is a hill, the Balidagh, steep and lofty, with some ruins on its summit, which he identified with ancient Troy and the citadel of Pergamus. His view was speedily adopted by Heyne, and afterward by Welcker, J. G. von Hahn, Choiseul-Gouffier, Texier, Forchhammer, Tozer, Leake, E. Curtius, and the majority of Greek archæologists and philologists, who until recently warmly defended it as the only possible means of harmonizing the Homeric text with the chorography and topography of the Troad. But the excavations made on the Balidagh brought to light only a few terra cotta figures, lamps, pottery, and coins of no ancient date, without revealing the foundations of a town or city. In 1871–'3 the German traveller Schliemann undertook to excavate at his own expense the hill of Hissarlik. (See Schliemann.) He dug to a depth of about 50 ft., and encountered several layers of ruins, each of which he considered to be the remains of a distinct city, one built on the ruins of the other. He unearthed a vast number of arms, household utensils, and ornaments of various degrees of workmanship and kinds of material. He produced a treasure of vases and various ornaments of gold, amber, and silver, which he thinks belonged to Priam, the Trojan king. He maintains that he has laid bare the palace of this king, the Scæan gates before it, the walls of Neptune and Apollo, the streets of the city, houses which must have been two or three stories high, sacrificial altars to Minerva, and 20 fountains, besides inscriptions of various dates and in several languages and dialects. In view of the fact that but few scholars are yet inclined to consider the existence and destruction of the Homeric Ilium a historical fact, and that almost all authorities are agreed that only the Balidagh near Bunarbashi was chosen by the poet as the central scene of his epic, the results of Schliemann's excavations have so far been looked upon, if not with suspicion, yet with little confidence in the identification which he claims to have made. At present (1876) the opinion generally entertained is that he has accidentally hit upon the site of some unknown Hunnic settlement, Lydian town, or Phœnician trading post. —See Lechevalier, *Voyage de la Troade* (3 vols., 3d ed., Paris, 1802); Forchhammer, *Beschreibung der Ebene von Troja* (Frankfort, 1850); Hahn, *Die Ausgrabungen auf dem homerischen Pergamos* (Leipsic, 1865); Tozer, "Lectures on the Geography of Greece" (London, 1873); and Schliemann, "Troy and its Remains," edited by Dr. Philip Smith (1875).

TROY, a city of New York, capital of Rensselaer co., on the E. bank of the Hudson river, at the head of steamboat navigation, and also at the head of tide water, 151 m. by the course of the river N. of New York city, and 6 m. N. of Albany; pop. in 1840, 19,334; in 1850, 28,785; in 1860, 39,235; in 1870, 46,465, of whom 16,219 were foreigners, including 10,877 Irish, 1,699 British Americans, 1,576 English, and 1,174 Germans; in 1875, 48,821. The surface of the city comprises the alluvial flats three fourths of a mile wide on the river, and the hills on the east known as Mt. Ida. Wynant's Kill on the south, and Poesten Kill ½ m. N., break through these hills in narrow ravines and in a series of cascades, the former furnishing 12 mill sites with 2,000 horse power, the latter 10 sites with 1,000 horse power; while the state dam across the Hudson, at the N. part of the city, furnishes 4,000 horse power. There is also an immense amount of steam power in use. The pure water with which the city is supplied by the Troy water works is drawn from Piscawin creek into reservoirs high enough to carry the water to the top of most of the houses. A new city hall, costing $150,000, is in course of construction. The savings bank building is an elegant edifice, costing $450,000, and there are several fine business structures. Troy is situated at the principal outlet of the Erie and Champlain canals, and is connected with Lake Champlain and the north by the Rensselaer and Saratoga, and Troy and Boston railroads, the latter connecting it with the east also; with the west by the New York Central railroad; with the south by the Hudson River railroad; and with the east by the Boston and Albany railroad. There is a daily line of steamers to New York in summer. In the centre of the city is the union railroad depot, one of the largest structures of the kind in the United States, 404 by 240 ft., with walls at the sides 27 ft. high supporting the roof in a single arch. All the railroad lines centre at this depot, and 60 trains arrive at or depart from it daily. The river is spanned by a bridge 1,600 ft. long, which is provided with two carriageways, a railway, and a walk for foot passengers, and also by a new iron bridge for pedestrians and carriages, costing $250,000.—The iron manufactures of Troy are of great importance, and by means of them the city has become a controlling point in the iron interest on this side of the Alleghany mountains. One of the largest manufacturing establishments of the country is the Albany and Rensselaer iron and steel company, which owns the Albany iron works, the Rensselaer iron works, Bessemer steel works, the Fort Edward blast furnace, and the Hudson blast furnace. The company employs 1,500 hands, and produces pig iron, merchant and angle iron, merchant steel, nails and spikes, axles, bolts and nuts, boiler rivets, iron and steel rails, horse shoes, &c. The Burden iron works, established in 1813, have an annual capacity of 40,000 tons, and employ 1,400 hands, producing pig iron, merchant iron, horse and mule shoes, and boiler rivets. The other iron manufactures of the city are carried on by more than 30 firms, and consist of stoves, hollow ware, hot air furnaces, machinery, steam engines, scythes, shovels, malleable iron, safes, butts, hinges, steel springs, agricultural implements, &c. The Troy stamping works manufacture stamped and pressed wares, coal hods, shovels, dampers, &c. The Troy car works are at Green Island, a suburb on the opposite side of the river. The annual product of the shirt and collar (linen and paper) business, which is more extensive here than anywhere else in the United States, and employs more than 30 factories, is valued at $3,000,000, requiring the labor of 6,000 hands, chiefly women. The largest manufactory of mathematical instruments in the United States is in this city, as is also one of the largest of the few American globe manufactories. There are brass founderies, breweries, two distilleries, two bell founderies, a cotton mill, carriage factories, a manufactory of stoneware, and several of boots and shoes, fire brick, and hosiery. The total annual value of the manufactures of Troy is about $10,000,000. The lumber trade is important. There are ten national banks, with an aggregate capital of $2,800,000, of which four have savings departments; a state bank, with $300,000 capital; and a savings bank, established in 1823. —The city is divided into 13 wards, and is governed by a mayor and a board of 26 aldermen. It has horse railroads and a good fire department. The assessed value of property in 1874 was $15,441,845. The taxation for city purposes was $575,801 25; for state and county purposes, $284,125 22. The total funded debt was $1,226,000; net debt, less sinking fund, &c., $738,550. The principal charitable institutions are the church home, Presbyterian church home, home for aged poor, Troy Catholic male orphan asylum, Troy orphan asylum, Troy hospital, Marshall infirmary, and home of the "Little Sisters of the Poor." The public schools embrace a high school and 15 ward schools, and have an annual enrolment of about 8,000 pupils and an average attendance of 4,500. The expenditure for school purposes is from $125,000 to $150,000 a year. The Troy female seminary, removed from Middlebury, Vt., to Troy in 1821, gained a national reputation under the charge of its founder, Mrs. Emma Willard; it was discontinued in 1870. The Rensselaer polytechnic institute, endowed by Stephen Van Rensselaer, was organized in 1824, for the purpose of teaching the application of mathematics to civil engineering and the natural sciences, and has in its special departments a high reputation. In 1874–'5 it had 13 instructors, 170 students, and a library of 3,000 volumes. St. Joseph's theological seminary of the province of New York, a Roman Catholic institution, was founded at Fordham in 1841, and removed to Troy in 1864. In 1874–'5 it had 6 professors, 126 students, and a library of 8,000 volumes. The Troy young men's association for mutual improvement has a valuable library of 19,000 volumes, and a reading room. It occupies a part of the beautiful freestone building known as the Athenæum, in which is also the post office. Three daily and five weekly newspapers are published. There are 50 churches, viz.: 6 Baptist, 1 Church of Christ, 8 Episcopal, 3 Jewish, 1 Lutheran, 9 Methodist, 11 Presbyterian, 9 Roman Catholic, 1 Unitarian, and 1 Universalist.—The first house of any note on the site of Troy was built by Matthias Vanderheyden in 1752, and is still standing on the S. E. corner of River and Division streets. Between 1786 and 1790 the tract was surveyed and laid out, with streets running at right angles excepting where such plan was interfered with by the course of the river. Hitherto the place had been variously known as Vanderheyden's ferry, Ferry hook, and Ashley's ferry; but on Jan. 5, 1789, the name Troy was adopted. At this time it contained five small stores and about a dozen dwellings. The first village charter was adopted in 1791. This was superseded by another on Feb. 16, 1798, and the village was formally incorporated by state acts passed April 2, 1801, and April 9, 1805. The city charter was granted April 12, 1816. Troy has suffered by three great fires: June 20, 1820, 98 buildings, loss $490,000; Aug. 25, 1854, 300 buildings, loss $1,000,000; and May 10, 1862, 671 buildings, loss $3,000,000.

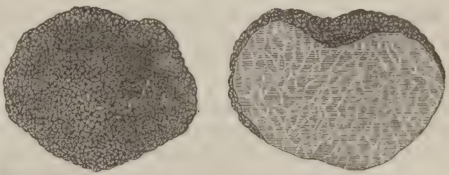
TROYES, a city of France, capital of the department of Aube, and formerly of Champagne, on the left bank of the Seine, 90 m. E. S. E. of Paris; pop. in 1872, 38,113. It has a cathedral with a celebrated choir and stained glass windows, and surrounded by five chapels, begun about 1200 and finished in the 16th century, and recently restored. The unfinished collegiate church of St. Urban, and those of St. John, St. Nizier, and the Madeleine, are likewise remarkable. The lyceum of Troyes is one of the finest in France. In the former abbey of St. Loup is an extensive collection of books and manuscripts. The museum is rich in coins and mosaics. The manufactures of cotton and woollen goods and hosiery are of great extent. Soap, sausages, and cheese are also made.—Troyes was originally the capital of the Tricasses. Under the Romans it was included in Gallia Lugdunensis, and became known as Augustobona, and in the 5th century as Trecæ. At the close of the 9th century it was devastated by the Normans. It was the seat of several councils, and under the counts of Champagne it rose in the 12th century to great importance. John the Fearless of Burgundy captured the town in 1415. The treaty uniting the French and English crowns, concluded here May 21, 1420, was sealed on June 2 by the marriage of Henry V. with the princess Catharine. During the war between Charles V. and Francis I. it was almost reduced to ashes by the former (May, 1524). In 1814 it was a prominent battle ground between Napoleon and the allies. In November, 1870, it was occupied by the Germans.

TROYON, Constant, a French painter, born in Sèvres, Aug. 25, 1810, died in Paris early in 1865. He was early employed at Sèvres in painting on porcelain, and began in 1833 to send his works to the annual exhibitions in Paris. He rose to the first rank of his profession, especially in landscapes and animals, and has been called the Lafontaine of his art. He painted many pictures illustrating Sèvres, St. Cloud, and other places near Paris. Among his animal and figure pieces are "The Fair of Limousin," "The Cattle Market," "The Watering Place," "The Poacher," "Working Oxen," "Hounds at Rest and in Motion," "Going to Market," and "Before the Storm" (a vigorously painted landscape with cattle and sheep). One of his most celebrated works, a landscape with animals, left unfinished at his death, was in 1869 presented by his mother to the museum of the Luxembourg, and placed in the Rubens gallery. Many of his pictures have been popularized by engravings. In 1875 his "Osier Bed" was sold in Paris for 24,200 francs, his "White Cow chased by a Dog" for 10,400 francs, and his "Pastures near Trouville" for 12,000 francs.

TROY WEIGHT, a scale of weights used in England and the United States for weighing gold, silver, and jewels, and in trying the strength of spirituous liquors, and legally established in both countries for determining the weight of coins. The derivation of the term is uncertain. In 1828 a standard troy pound in brass brought from England was declared by act of congress the legal standard of the United States mint. It is equal in weight to 22·815676 cubic inches of distilled water at 62° F., the barometer being at 30 inches. It contains 5,760 grains, of which 24 make a pennyweight, 20 pennyweights an ounce, and 12 ounces a pound. It is the standard of the imperial system of weights in England, and from it is derived the avoirdupois pound, which contains 7,000 troy grains; and 1 lb. avd. = 1·2152777 + lb. troy. (See AVOIRDUPOIS.) It is identical with the pound of apothecary's weight, and the ounce and grain of these two weights are also correspondingly the same. The pennyweight subdivision of troy weight, determining the weight of the silver penny, was established in 1266, as equal to the weight of 32 grains of wheat taken from the middle of the ear. As the kings of later times found it expedient to reduce the value of the penny, this reduction was accompanied by a proportional diminution in the number of grains of which it was composed. A troy weight was established in 1618, the pound of which weighed 1·321 pound troy. This is now abolished by law.

TRUCE OF GOD (Lat. *treuga Dei* or *trewa Dei*, from Ger. *Treue*, faith), an institution of the middle ages, designed to mitigate the violence of private war by prohibiting hostilities from Thursday evening to Sunday evening of each week, also during the entire season of Advent and Lent, and on certain festival days. The days of the week selected were supposed to be rendered holy by the death and resurrection of Christ. It was introduced after the great famine of 1028–'30, by the bishops of Aquitaine, who proclaimed a universal peace; as it was found impossible to enforce this, they were obliged to limit it to certain days, and thus arose the truce of God in its peculiar sense. The regulation soon spread over all France. In 1041 the Aquitanian bishops ordered that no private feuds should be prosecuted from sunset on Wednesday to sunrise on Monday following. This was extended by the council of Clermont to the time from Advent to Epiphany, from Lent to eight days after Pentecost (Whitsuntide), and afterward to the feasts of the Virgin, of John the Baptist, of the apostles Peter and Paul, and of All Saints, and the eves of those days. Calixtus II., at the council of Rheims in 1119, renewed the truce of God, commanding war to cease on the above mentioned times throughout Christendom; all violators were to be excommunicated, and, unless satisfaction were given either by themselves or by their children, were to be denied a Christian burial. When the states of Europe began to assume a more consolidated form, and violations of peace and order came under the control of the civil authority, the truce of God disappeared.

TRUFFLES, underground fungi, used as food; those of commerce belonging to the genus *tuber*, while others which bear the name are of related but different genera. The early English writers called them "trubbes," both names being derived through the Italian from the Latin *terræ tuber*. They are somewhat oblong or globose, varying from two ounces to several pounds in weight, according to species and locality; there are white kinds, but generally the surface is blackish or brownish, and roughened with warty protuberances. When cut open they present a variously marbled appearance, and have no resemblance to the generally known forms of fungi; the hymenium, or reproductive portion, is found in the veins which traverse the mass in all directions; in these are found minute sacs, each containing several spores, the surface of which is covered with spines or is honeycombed. But little is known about their early development, and their mycelium, or vegetative portion; when mature, they are quite free from attachment to any other body. Truffles are generally found in calcareous soils, and always in woods, of oak or beech; hence it has been inferred that at some stage of their existence they are parasitic upon the roots of trees; they are found in many parts of England, more abundantly on the continent, and in Africa. The existence of truffles in the United States is very doubtful; the occasional announcement of their discovery is due to the finding of the Indian bread. (See TUCKAHOE.) In England truffles are hunted by a particular breed of dogs, which are trained by hiding a truffle and teaching them that their food depends upon finding it by the scent; the dogs become so expert that they rarely make a mispoint; when the truffle is dug up, the dog is rewarded with a bit of food. On the continent a similar service is performed by sows. The attempts to cultivate the truffle have not been successful, as the mycelium or spawn, the vegetative portion of the plant, which allows mushrooms to be cultivated so readily, has not yet been obtained. They have been produced by sprinkling the earth with water in which the parings of truffles had been steeped; and in some parts of France a piece of calcareous soil, sown with acorns, has yielded truffles as soon as the saplings attained a few years' growth. The English truffles are *tuber æstivum;* the more highly prized French are *T. melanosporum*, and the Piedmontese, which bring the highest price of all, *T. magnatum;* several others are known which are not found in commerce. In Algiers a truffle of another genus



French Truffle (Tuber melanosporum).

(*terfezia*), and of fair quality, is remarkably abundant, and several have been found in Australia. Truffles have an odor and flavor peculiarly their own, and though sometimes cooked by themselves, they are most generally used for communicating their flavor to meats. The truffles used in this country are imported in sealed tin cans.—The production of truffles in France in 1874 amounted to 1,588,100 kilogrammes (one fourth in the department of Vaucluse), valued at 15,588,100 francs.

TRUJILLO, or Truxillo (anc. *Turris Julia*), a town of Spain, in the province of Cáceres, on the Tozo, a small tributary of the Tagus, 130 m. S. W. of Madrid; pop. about 6,000. It consists of three parts, the citadel, old town, and city, which stand respectively on the summit and slope and at the foot of a hill. The whole place has the appearance of decay, and the upper and more ancient part is now used as a burying ground, the inhabitants having abandoned it. The fortress dates from Roman times. In the lower town there is an extensive square, on which is the mansion of the family of Pizarro, the front being ornamented with numerous bass reliefs representing the conquest of Peru. Roman antiquities have been found here.

TRUJILLO, or Truxillo, a town of Peru, capital of the department of Libertad, 1½ m. from the sea, in the valley of Chimu, 310 m. N. N. W. of Lima; lat. 8° 7′ S., lon. 79° 9′ W.; pop. about 8,000. It is on the side of a mountain, and is surrounded by a mud wall flanked with bastions. It has a cathedral, several churches, a college, a hospital, and a theatre. Rice and spice are exported from Huanchaco, its port, about 8 m. N. W. Trujillo was founded by Pizarro. It has ancient Peruvian remains.

TRUMBULL, a N. E. county of Ohio, bordering on Pennsylvania, watered by Grand and Mahoning rivers; area, 625 sq. m.; pop. in 1870, 38,659. The surface is undulating and well timbered, and the soil fertile and adapted to dairy farming. Pymatuning swamp occupies part of the county. It is intersected by the Atlantic and Great Western railroad and branches, and by the Pennsylvania and Ohio canal. The chief productions in 1870 were 113,476 bushels of wheat, 16,229 of rye, 383,662 of Indian corn, 433,407 of oats, 156,912 of potatoes, 36,194 of flax seed, 213,572 lbs. of wool, 140,723 of maple sugar, 4,651,796 of flax, 1,162,581 of butter, 1,368,595 of cheese, and 59,481 tons of hay. There were 8,067 horses, 19,811 milch cows, 14,297 other cattle, 47,168 sheep, and 7,580 swine; 1 manufactory of bagging, 22 of carriages and wagons, 20 of cheese, 11 of cooperage, 5 of dressed flax, 7 of furniture, 16 of iron, 4 of machinery, 1 of linseed oil, 13 flour mills, 6 tanneries, 4 currying establishments, 3 breweries, 8 planing mills, and 30 saw mills. Capital, Warren.

TRUMBULL, Benjamin, an American clergyman, born in Hebron, Conn., Dec. 19, 1735, died in North Haven, Conn., Feb. 2, 1820. He graduated at Yale college in 1759, and in 1760 became pastor of the Congregational church at North Haven. He served in the revolution both as a chaplain and a soldier. He published "A Plea in Vindication of the Connecticut Title to the contested [Western] Lands" (anonymous, 1776); "Twelve Discourses on the Divine Origin of the Scriptures" (12mo, 1790); a "Complete History of Connecticut, 1630–1764" (2 vols. 8vo, 1797 and 1818); and a "History of the United States" (vol. i., 1810, unfinished).

TRUMBULL, James Hammond, an American philologist, born in Stonington, Conn., Dec. 20, 1821. He entered Yale college in 1838. He was assistant secretary of the state of Connecticut, 1847–'52 and 1858–'61, and secretary from 1861 to 1865. Since 1863 he has been superintendent of the Watkinson library of Hartford and president of the Connecticut historical society. He was one of the original members of the American philological association, and was its president for the year 1874–'5. In 1873 he was appointed lecturer on the Indian languages of North America in Yale college. He has published "Colonial Records of Connecticut, 1636–'89" (3 vols. 8vo, Hartford, 1850–'59); "Roger Williams's Key to the Indian Language" (1866); "The Composition of Indian Geographical Names" (1870); "The Best Method of Studying the American Languages," and "Some Mistaken Notions of Algonkin Grammar" (1871); "Historical Notes on the Constitutions of Connecticut," "Notes on Forty Algonkin Versions of the Lord's Prayer," and a reprint of Pierson's "Some Helps for the Indians" (1873); and several other historical and philological papers.

TRUMBULL, John, an American poet, born in Watertown, Conn., April 24, 1750, died in Detroit, Mich., May 12, 1831. He graduated at Yale College in 1767, and became a tutor in 1771. In 1773 he was admitted to the bar, and in 1781 he removed to Hartford. He was a member of the state legislature, and from 1801 to 1819 a judge of the superior court. In 1825 he removed to Detroit. His best known work is "McFingal," a revolutionary satire (canto i., 1775; complete in 4 cantos, 1782), of which more than 30 unauthorized editions were sold before 1820 (latest ed., with notes by B. J. Lossing, New York, 1864). He also published "The Progress of Dulness," a satire on the prevailing modes of education (3 parts, 1772–'3); "Elegy on the Times" (1774); and with Timothy Dwight 40 papers in the manner of the "Spectator." His "Poetical Works" appeared in 1820 (2 vols., Hartford).

TRUMBULL. I. Jonathan, an American revolutionist, born in Lebanon, Conn., Oct. 12, 1710, died there, Aug. 17, 1785. He graduated at Harvard college in 1727, studied theology, and was licensed to preach, but in 1731 took the place of an elder brother, who was lost at sea, in his father's mercantile business. In 1733 he was elected to the general assembly of Connecticut, of which in 1739 he became speaker. He was chosen an assistant in 1740, and was reëlected 22 times. He became afterward judge of the county court, assistant judge of the superior court, and from 1766 to 1769 was chief judge of the superior court. In 1767 and 1768 he was elected deputy governor, and in 1769 governor of the colony, which office he held till 1783, when he resigned. He was one of the first to espouse the popular cause in the troubles preceding the revolution, and in 1765 refused to take the oath required of all officials to support the provisions of the stamp act; and he coöperated with vigor in securing the independence of the colonies. Washington relied on him, says Sparks, "as one of his main pillars of support," and was accustomed to consult him in emergencies. The personification humorously applied to the United States is said to have had its origin in a phrase sometimes used by Washington: "Let us hear what brother Jonathan says."—See I. W. Stuart's "Life of Jonathan Trumbull, sen." (8vo, Boston, 1859). **II. Jonathan,** son of the preceding, born in Lebanon, Conn., March 26, 1740, died there, Aug. 7, 1809. He graduated at Harvard college in 1759, and was for several years a member of the legislature and speaker of the house. At the outbreak of the revolution he was appointed paymaster to the northern department of the army, which post he held till 1780, when he became secretary and first aide-de-camp of Washington, with whom he remained until the close of the war. He was a representative in congress from 1789 to 1795, and presided as speaker during the last four years. In 1795 he was elected United States senator, and in 1796 lieutenant governor of Connecticut. He became governor in 1797, and held the office until his death. **III. John,** an American painter, brother of the preceding, born in Lebanon, Conn., June 6, 1756, died in New York, Nov. 10, 1843. He graduated at Harvard college in 1773, and afterward studied painting in Boston. In the spring of 1775 he joined the first Connecticut regiment as adjutant, and in August became second aide-de-camp to Washington, and soon after major of brigade. In 1776 he was appointed by Gen. Gates adjutant general with the rank of colonel, which office he resigned in the spring of 1777. In 1780 he went to London and became a pupil of Benjamin West, but was arrested soon after, during the excitement occasioned by the execution of Major André, and imprisoned for eight months. He was finally admitted to bail on condition of quitting the kingdom within 30 days, and returned home in January, 1782; but on the conclusion of peace he again went to England and resumed his studies under West. In 1786 he produced his first modern historical picture, the "Battle of Bunker Hill," and soon after his "Death of Montgomery before Quebec," the former of which was engraved by J. G. Müller of Stuttgart, and the latter by F. Clemens of London. His next picture, the "Sortie of the Garrison from Gibraltar," one of the repetitions of which is in the Boston Athenæum, is widely known through Sharp's engraving. In 1789 Trumbull returned to America to procure likenesses of revolutionary officers for his contemplated series of national pictures. He painted several portraits of Washington, one of which belongs to the city of New York. In 1794 he went again to England as secretary to Mr. Jay, the American minister, and in 1796 was appointed fifth commissioner for the execution of the seventh article of Mr. Jay's treaty of 1794. The duties of this office occupied him till 1804, when he returned to the United States. From 1808 to 1815 he resided in England, painting with indifferent success; and from 1817 to 1824 he was employed in executing for congress four pictures to fill compartments in the rotunda of the capitol, each 18 by 12 ft. For these works, which represent respectively the "Declaration of Independence," the "Surrender of Burgoyne," the "Surrender of Cornwallis," and the "Resignation of Washington at Annapolis," he received $32,000. Subsequently for many years he was engaged in finishing former sketches and in painting copies of his national pictures on a uniform scale of 9 by 6 ft. Many of these, together with portraits and several copies of the old masters, 54 pictures in all, he finally gave to Yale college in consideration of a life annuity of $1,000. The collection was at first deposited in the "Trumbull gallery," a building erected especially for it, but in 1867 it was transferred to the new art building. Col. Trumbull passed the latter part of his life in New York, and was president of the American academy of fine arts from its foundation in 1816 until the formation of the national academy of design in 1825.

TRUMPET, a musical wind instrument of brass or other metal, which under one form or another has been known in all ages and among all races having any claim to civilization. The trumpet, so called in modern use, is generally understood as a tube 8 ft. in length, expanding at the end whence the sound issues into a bell-like shape, and doubled up in a parabolic form. It is played through a mouthpiece, and has a natural compass from G below the staff to E above. Trumpets with pistons and cylinders have the advantage of being able to give all the intervals of the chromatic scale.

TRUMPETER, in ornithology. See Agami.

TRUMPET FISH. See Pipe Fish.

TRUMPET FLOWER, a popular name especially for *tecoma radicans*, used with a prefix for other related plants. The genus *tecoma* (from the Mexican name), separated from *Bignonia* on account of a structural difference in the pods, consists of about 50 species, mostly trees and natives of tropical America. The trumpet flower, *T. radicans*, is a woody vine, climbing to a great height by abundant rootlets produced along the stem; the pinnate leaves have 5 to 11 ovate, toothed, pointed leaflets; the flowers, in midsummer or later, are in corymbs; the corolla is tubular-funnel-shaped, 2 to 3 in. long, with five somewhat irregular lobes, within which the four stamens are included; the fruit is a two-celled pod, containing numerous winged seeds. This, which is often called trumpet creeper, is found from Pennsylvania and Illinois southward, and is very common in cultivation, it being vigorous and perfectly hardy, soon covering a large space, and reaching to the height of 60 ft.; it blooms in July and August, when flowers are scarce, and the abundance of its orange and scarlet bloom makes it very showy. It is a useful vine to drape a tree that is not in itself pleasing, and to cover the sides of brick or stone buildings; its faults are a tendency to become naked below, which may be remedied by cutting back, and an abundant production of suckers; it should not be planted near borders, as its roots extend a long distance.—*Bignonia capreolata* is a closely related climber, with a more southern range; its leaves consist of but two leaflets and a terminal tendril; its flowers, similar to those of the preceding, are orange; this is known in the southern states as cross-vine, as the wood cut transversely shows a cross. The great-flowered trumpet flower (*tecoma grandiflora*), from China and Japan, in its garden varieties, is a very showy climber; it does not reach very high, and has narrower leaflets than our native species and much larger flowers, which are bell-shaped and 3 in. across; in some varieties they are very dark-colored; it is scarcely hardy north of New York city.—Some species are cultivated in greenhouses, the most frequent being *T. Capensis*, with curved orange flowers, and *T. jasminoides*, from Australia, with bright green leaves, and white flowers which are purplish on the throat. The related *Bignonia venusta*, from Brazil, with crimson flowers, is a gorgeous climber for a warm greenhouse. A very neat non-climbing shrub is *tecoma stans*, of southern Florida and northern Mexico; it is about 4 ft. high, with large clusters of lemon-yellow flowers; it is hardy at Washington.

Trumpet Flower (Tecoma radicans).

TRUNK FISH, the name of the plectognathous fishes of the genus *ostracion* (Linn.), derived from the bony case in which their soft parts are enclosed; they are also called coffer fishes. The head is prolonged into a snout, at the end of which is the mouth, with fleshy lips, and armed with a series of distinct teeth, 10 or 12 in each jaw, received into sockets, somewhat like the human incisors; body covered by bony plates, large, quadrangular or hexagonal, encasing the animal in an inflexible bony armor; tail enclosed in a bony tube, this and the pectoral fins being the only movable parts; even the vertebræ are usually immovable; eyes large and prominent; dorsal single, far back, small, and entirely soft; pelvic bones and ventrals absent; body three- or four-sided, with linear branchial openings, bordered by a fleshy edge within which are the gill covers. They have very little flesh, and some are believed to be poisonous; the stomach is membranous and very large; the liver is also large, often yielding a considerable quantity of oil; some are armed with spines on the head and body; they are generally small, and found in the tropics. There are a few species on the coast of the United States, arranged by De Kay in his genus *lactophrys*, having a triangular body, with strong spines, directed backward, in front of the anal fin, and the orbits usually spinous. Yale's trunk fish (*O.* [*L.*] *Yalei*, Storer), on the coast of Massachusetts and New York, is 14 in. long, with two abdominal spines. There are also species in the East Indies.

Yale's Trunk Fish (Ostracion Yalei).

TRURO, the capital of Colchester co., Nova Scotia, at the head of Cobequid bay, and on the Intercolonial railway at the junction of the Pictou branch, 67 m. by rail N. N. E. of Halifax; pop. in 1871, 3,998. It is one of the handsomest places in the province, and contains, besides the county buildings, several churches, a branch bank, and the provincial normal and model schools. There are manufactories of engines, iron castings, axles, machinery, boots and shoes, lasts and pegs, hats, leather, wooden ware, and woollens.

TRUSS, a contrivance for preventing the reappearance of a hernial tumor after its reduction. The general form of the truss is a flat steel spring covered with soft leather or oiled silk, and having its ends approximating to within a few inches of each other; attached to one end is a small round or oval pad, stuffed with cotton or wool, and having for its basis a small iron plate; the other end of the spring has either a larger and flat pad, or a strap connected with it. The smaller pad is placed over the ring or point where the hernial tumor has protruded (see HERNIA), and the spring passes over the hip, and either exerts its pressure by means of the large counter pad on the back, or is by means of a strap passing over the opposite hip connected with the pad by a buckle or eyelet and button on the back of the pad. Sometimes, where it is necessary to adjust it with great care, another strap passing over the inner surface of the thigh connects with the spring on the back. Where, as is sometimes the case, there is a double hernia, this spring is made sufficiently long to clasp over both hips, and has a pad at each end. In this case there should be a pad attached to the middle of the spring to exert gentle pressure on the spine, and thus keep the truss more perfectly in position. There are numerous patterns of trusses, varying considerably in form, but they may all be reduced to three classes: those with a flat pad, intended to press upon the whole surface of the ring or place through which the intestine protrudes; the oval or egg-shaped pad, which presses directly into the ring, and thus prevents the escape of the intestine; and the semicircular pad, which acts by supporting the intestine from above and pressing it away from the point of rupture. The truss, though preventing the recurrence of the hernial tumor when properly adjusted, seldom effects a radical cure. This has been attempted by purposely so adjusting it as to cause it to produce some inflammation and adhesion of the serous surface around the ring so as to effect complete occlusion of it; but it should never be done except under the direction of a skilful physician, as it is attended with danger.

TRUSTEE PROCESS, a process in certain states for reaching the goods or credits of a debtor in the hands of another who holds them for or is indebted to him. The proceeding for the purpose is by suit collateral to the suit against the debtor, in which the person proceeded against will be charged as trustee of the debtor, and adjudged to pay or account in satisfaction of the principal claim. The alleged trustee is examined on oath, and whatever belonging to the debtor is found in his hands is attached from the time the process is served upon him. The proceeding is purely statutory. In some states the corresponding proceeding is called a proceeding in garnishment, and the trustee is designated a garnishee. In these proceedings the trustee cannot be compelled to do more than he was bound to do by his contract or arrangement with the debtor.

TRUSTS. It is quite certain that trusts, which have now such immense importance in the law and the disposition of property in England and in the United States, originated in fraud. The feudal law of tenures embarrassed owners of property in their disposal of it, and the statutes of mortmain obstructed the appropriation at the pleasure of the owner still more; and to evade these rules of law, trusts (or the granting of property in trust) were invented. As the common law took no cognizance of trusts, they came before a court of equity. And if we remember that the chancellor was in early times usually a priest, and that the statutes of mortmain, which trusts were invented to evade, restricted or prohibited the granting of property to religious communities, we can understand why the court of equity took them under its protection. It did this by summoning the trustee before it, and compelling him "to do what justice and equity required." Hence Sir Robert Atkins, in the reign of Charles II., said: "A trust had for its parents fraud and fear, and for its nurse a court of conscience." The way in which these laws were successfully evaded by trusts was this. If property is given to A. B., with all the forms of law, and in the same manner as if it were to be absolutely his own, but in fact for the use and benefit of C. D., the common law knows no one but A. B.; all the title is in him, and the estate in him is protected against all forfeitures but those which attach to him. But C. D. has all the benefit and advantage of the property. Hence if C. D. were a traitor, who would have forfeited the estate had it been his in law, or a religious body which could not take the estate by law, A. B. still might hold it for the benefit of C. D. In this way fraud and fear were the parents of trusts. But as the law knew no estate or title but that of A. B., if he chose to be dishonest, and to refuse all benefit of the trust to C. D., there was no remedy at law, and the trust would have been defeated. Then the court of equity came in, and, by compelling A. B. to perform the trust he had undertaken, became the nurse of this child of fraud. Now, however, trusts are employed in a vast number of cases, most honestly and beneficially, wherever it is desired to give any person the benefit and use of property, but to keep from him all power of forfeiting or alienating it. The greatest number of modern trusts are created either by will or by transfer *inter vivos* to protect the estates of women from the control or the creditors of their husbands, or to carry down property to a series of holders, in some other way than that which would be provided by the laws of inheritance or distribution. To all trusts there are therefore two parties. One of these holds the legal title to the estate, and he is called trustee; the other has the actual benefit of the trust, and is called, by a Norman French phrase, the *cestuy que trust*. As the trustee has all the title which a court of law can recognize, he is said to have the legal estate; and as the *cestuy que trust* has an interest which only a court of equity can recognize and protect, he is said to have an equitable estate. At present, when the courts of law and the rules of law are coming nearer to the courts and the rules of equity, the antagonism between these has passed away, and the distinction become much less important. There may be any number of trustees and any number of *cestuy que trusts* in any trust. If the trustee holds the property for the benefit of the *cestuy que trust* without any particular restrictions, directions, or provisions, it is called a simple trust; and then the nature and operation of the trust are determined by legal or equitable construction. But if the purposes of the trust, and the manner in which and the means by which these purposes shall be accomplished, are specifically pointed out and defined, it is then a special trust, and these special directions must be accurately complied with. Hence a trust may be merely ministerial; and it is so called when the trustee has no other duty than to collect and pay over the proceeds of property. Or it may be a discretionary trust, and is so when the general purpose only is declared, and the manner in which this purpose shall be accomplished is left to the discretion of the trustee. So a trust may have a power annexed; as when a trustee of lands has the power of leasing, or even of selling and converting them into personal property. And indeed any lawful powers may be given to a trustee. There are also private trustees and public trustees. The former hold property for one or more individuals, who are distinctly pointed out, personally or by description. Public trustees are those who hold property for the benefit of the whole public, or for a certain large part of it, as a county, town, or parish. They are regarded by the law as in many respects official persons, with official rights and responsibilities.—The subject matter of a trust may be any property of a valuable nature, and many things also which the common law does not recognize as disposable or assignable property; as choses in action and probabilities of every description, or mere authorities which may be or become valuable. Even if the property be in another state or country, so that the process of the court could not reach it, yet a court of equity will interfere in any case of trust, however distant or inaccessible the property may be, provided the principal defendants are actually served with process, and adequate relief may be given by a decree *in personam.*—As to the capacity of creating a trust, it may be said that any person who has the power of making a valid disposition of any property, by will or grant, has also the power of attaching to his disposition of the property such limitations or directions as shall create a trust. As a general rule, any person may be a trustee, even if he be incapacitated by law from transacting business on his own account. Thus infants, idiots, lunatics, married women, or other persons *non sui juris*, may become trustees. The reason is, that the trust is created for the benefit of the *cestuy que trust*, and not of the trustee; and if the trustee cannot take the legal estate, there will be nothing to support the equitable estate, and the trust will fail. So, too, it is established doctrine that a trust once created shall never fail on account of the death of a trustee, or his refusal to accept the trust. All difficulties of this kind are avoided by the power of the proper court (usually the court of equity) to remove a trustee and supply his place, or fill the place of a trustee when vacant by his death or refusal. It is very common for a will or deed creating a trust to prescribe in what way and by what person or tribunal this power may be exercised; and provisions to this effect would doubtless be regarded when they did not contravene the general principles of the law, or the statutory provisions in behalf of trusts and trustees. Any person in possession of property, real or personal, by legal title and of his own right, may, by a proper declaration of trust, convert himself into a trustee, and then his legal title will remain undisturbed, but subjected to the equitable interest.—Any person may become a *cestuy que trust* of property, to the extent of his legal capacity of holding the same. Nor is it necessary to the creation of a trust estate that the *cestuy que trust* should be named, or even that he should be in being when the trust is created. Thus money may be bequeathed or given to a trustee for any children that a certain person may have living at his death, and to accumulate until the death of that person. The assent of the *cestuy que trust*, if he is capable of giving one, is, strictly speaking, necessary; but it will be presumed where the trust is beneficial to him. Unincorporated societies and institutions may take the benefit of a trust, as well as natural persons or corporations.—Trusts and uses (see Uses) were originally created and declared principally, if not exclusively, by parol; but this was because they were then intended to evade the law. Now, it is uncertain whether trusts of real estate can be created except in writing, and for some purposes by deed. In most of the United States, the provisions of the English statute of frauds, requiring trusts to be in writing, have been reënacted. But in England courts of equity have given a very liberal construction to these provisions, and a similar construction might be expected here. Where a trust is created, if at all, by a writing, especially if that writing be a will, any direct fiduciary expressions, indicative of a purpose that the donee of the property is to take it, in whole or in part, for the benefit, use, advantage, or support of another, will be held sufficient to create a trust. But such words or directions must be imperative on the donee; if they, by fair construction, only give him a power or permission, or even express a desire which is not obligatory on him, they do not create a trust. If the trust is distinctly and positively created, although no *cestuy que trust* is designated, the courts will enforce the trust.

If the donee may at his own discretion or pleasure execute the alleged trust or not, it is not a trust; but it is a valid trust if he must execute the trust, although the manner of doing it is entirely at his discretion. So, too, there may be what are called "resulting" or "presumptive trusts," which are expressed nowhere, but are implied or presumed from the assumed intention of the parties, or arise from the nature of the transaction; and the statute of frauds expressly excepts these trusts from the requirement of writing.—A trustee is always at liberty to decline a trust, but he cannot take the property without the trust. The best and usually the only evidence of an acceptance of the trust is some action by the trustee under it. The same person may stand in different relations; thus he may be appointed executor and also trustee; and he may give separate bonds with different sureties, as executor and as trustee. In such cases it is sometimes difficult to say where the duty and responsibility of executor end and those of trustee begin. The general rule is this: If the executor has specifically set apart a portion of the estate to the purpose of the trust, he will be considered as to that portion as having discharged his duty as executor and entered upon his duty as trustee.—An important doctrine of the law of trusts, familiar to English lawyers and frequently applied in English courts, is known by the name of the *cy-pres* doctrine. This phrase means literally "near to it;" and this doctrine is applied when a trust is certainly created, and it is impossible to execute it precisely as the donor prescribed, and then a court of equity, from its desire to sustain the trust, will direct an exercise of it as near as possible to the original intention of the donor. By far the most frequent occasion for its application arises from the change of circumstances in ancient trusts; as, for example, where there is an endowment for a school limited to pupils of a certain description, and there are not now any pupils of that description. But that necessity cannot exist so frequently or with so much force in the United States as in England. As an undefined judicial power, it is open to abuse, and can scarcely be said to be recognized in the United States.—Trustees are held, both in England and in this country, to a somewhat strict accountability. A trustee is bound not only to guard against loss or damage to the trust property, but to see that it is made reasonably productive. If he suffers it to lie idle unreasonably, when safe investments can be made, he will be charged with interest, and in some cases, as when he is guilty of gross delinquency, or if he mingles the property with his own for his own benefit in trade or otherwise, he will be charged with compound interest. He may not himself buy property which he sells as trustee, nor sell his own property and buy it as trustee; and this rule is applied not only to all trustees, but to agents generally.—An important difference between private and public trustees should be mentioned. Private trustees are responsible on the contracts they make as trustees, unless they guard against this by express reservation; and merely calling themselves trustees, or even saying they act as trustees, is not, generally speaking, sufficient. Thus an executor, signing a common promissory note as executor, is still liable on it personally, although the estate be insolvent. But public trustees, or persons acting in a known official capacity, are not personally liable on the contracts they make for the state or government, unless they make themselves so expressly or by a reasonable implication, or have in their hands funds for the purpose of the contracts. It is, of course, always in the power of one who deals with a public trustee or agent to ask of him his own personal liability; and it is always in the power of that trustee to give it or withhold it.

TRUXILLO. See Trujillo.

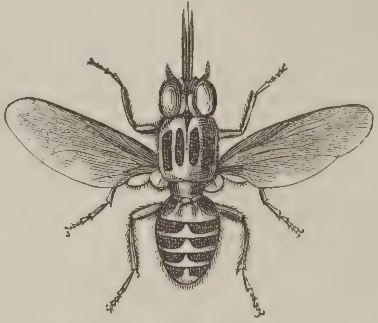
TRUXTUN, Thomas, an American naval officer, born on Long Island, Feb. 15, 1755, died in Philadelphia, May 5, 1822. During the revolution he served in privateers as lieutenant and captain, and made valuable captures. In 1795 he received a commission as captain in the navy. On Feb. 9, 1799, in the frigate Constellation, 38 guns, off the island of Nevis, he captured the French frigate L'Insurgente, 40 guns, which was much cut up, and lost 29 men killed and 41 wounded. The Constellation sustained but little injury, and had one man killed and three wounded. On Feb. 1, 1800, the Constellation engaged off Guadeloupe the French frigate La Vengeance of 54 guns, which escaped into Curaçoa dismasted and sinking, with a loss of 50 killed and 110 wounded. The loss of the Constellation was 14 killed and 25 wounded. Her mainmast went by the board at the close of the action, which prevented her from pursuing. For this action congress awarded Truxtun a gold medal. In 1802 a squadron was fitted out against Tripoli, and Truxtun having declined the command because he was refused a captain for his flag ship, his declination was construed into a resignation, and his name was struck from the navy list. He retired to Philadelphia, where in 1816-'19 he was high sheriff. He published "Remarks relating to Latitude and Longitude and Variation of the Compass" (1794), and a volume of extracts on naval tactics (1806).

TSARSKOE SELO. See Tzarskoye Selo.

TSCHIRNHAUSEN, Ehrenfried Walter von, count, a German mathematician, born at Kislingswald, near Görlitz, April 10, 1651, died there, Oct. 10, 1708. He studied at Leyden, in 1672 volunteered against France, and afterward visited England, France, and Italy. After his return he constructed optical instruments, and established glass factories and a mill for the polishing of burning glasses, one of which weighed 160 lbs. and was 33 in. in diameter. He also constructed a burning mirror of highly polished copper, producing effects similar to those of the burning glass. He discovered a method from which the manufacture of porcelain in Saxony took its rise, and investigated the properties of the curves which go under his name. He published *Medicina Corporis* (Amsterdam, 1686) and *Medicina Mentis* (1687), afterward combined in several editions, and *Anleitung zu nützlichen Wissenschaften, absonderlich zu der Mathesis und Physik* (Leipsic, 1700; 3d ed., 1712).

TSCHUDI. I. Ægidius (Gilles), a Swiss historian, born in Glarus in 1505, died there, Feb. 28, 1572. He served in the French army from 1536 to 1544, held several important offices in his canton both before and afterward, and in 1559 went as Swiss envoy to the imperial court of Ferdinand I. at Augsburg. He was banished in 1562 for inducing the Catholic delegates to attend the council of Trent, but was recalled in 1564 to settle the conflict between the see and the city of St. Gall. He wrote many works, of which the best known is his *Chronicon Helveticum* (in German), embracing the history of Switzerland from 1000 to 1470 (2 vols., Basel, 1734–'6). **II. Johann Jakob von,** a Swiss naturalist, a descendant of the preceding and grandson of a historian of the same name, born in Glarus, July 25, 1818. He completed his studies in Paris, and explored Peru from 1838 to 1843, and Brazil and other South American states in 1857–'9, and subsequent to his appointment as Swiss minister to Brazil in 1860. In 1866 he became minister at Vienna. His works include *Peru: Reiseskizzen aus den Jahren* 1838–'42 (2 vols., St. Gall, 1846; translated into English in 1847 by T. Ross); *Untersuchungen über die Fauna Peruana* (St. Gall, 1844–'7); *Die Ketschuasprache* (2 vols., Vienna, 1853), with a Peruvian grammar and dictionary; *Reise durch die Andes von Südamerika* (Gotha, 1860); *Die brasilische Provinz Minas-Geraes* (Gotha, 1863); and *Reisen durch Südamerika* (5 vols., Leipsic, 1866–'9). He has also edited, in conjunction with Don Mariano Eduardo de Rivera, the *Antigüedades Peruanas* (Vienna, 1851; translated by the Rev. F. L. Hawks, 8vo, New York, 1854). **III. Friedrich von,** a naturalist, brother of the preceding, born in 1820. He became president of the council of education of the canton and great councillor of the city of St. Gall, and wrote a popular manual of agriculture and other works. His *Thierleben der Alpenwelt* (Leipsic, 1852; 9th ed., 1872) has been translated into several languages.

TSETSE, the native name of a proboscidian dipterous insect of the genus *glossina* (Wiedemann), peculiar to Africa, and especially to the tropical portions. This genus comes near *stomoxys* (Fabr.), and resembles in appearance and habits the gadfly called in Scotland cleg (*hæmatopota pluvialis*, Meig.). The best known species, *G. morsitans* (Westw.), is 5 lines long and 8½ in expanse of wings, a little larger than the house fly; the head is dirty buff, and the eyes are large; thorax chestnut red, with four longitudinal black bars; abdomen dirty buff, with black bristles above, the first segment with a round black spot at each side, and the four following with a broad dark brown band interrupted in the middle; the wings are considerably longer than the body. The blood-sucking apparatus consists of a long horny proboscis, containing a compound bristle or two needle-like piercers, communicating with a poison bulb at the base, and supported on each side by two feathery palpi. It is very active and difficult to catch, except in the cool of the morning and evening, when it is sluggish; it has a loud and peculiar buzz, which does not terrify cattle like that of the gadflies. This scourge of the African wilderness has no sting in the tail, and deposits no eggs on or under the skin of animals, but introduces its poison into the blood by the proboscis while sucking. The puncture of the tsetse is almost certain death to the ox, horse, sheep, and dog, but is harmless to man, the mule, ass, goat, pig, wild animals, and even calves while sucking; in man it causes a slight itching, like that produced by the bite of the mosquito or flea. It produces no immediate effect in the ox or horse, but in a few days there appears an exudation for half an inch around the punctures, the eyes and nose begin to run, the skin quivers as if from cold, and swellings occur under the jaw; the animal may continue to graze, but by degrees grows thin and weak; this state may continue for months, until purging comes on, and death ensues from exhaustion. The better the condition of the animal bitten, the more speedy often will the death be, accompanied by symptoms of staggering and blindness; sudden changes of temperature hasten the progress of the disease, which goes on to certain death. They occasionally attack a horse like a swarm of bees, alighting on him by hundreds, sometimes causing death in a week. After death the subcutaneous areolar tissue is found to be injected with air, and the fat is oily and greenish yellow; the heart and muscles are very soft and flabby, the gall bladder distended with bile, the blood much reduced in quantity, with signs of disease in the lungs and liver. No remedy is known; the natives



Tsetse (Glossina morsitans), enlarged.

pretend to have roots which, pounded and sprinkled on the hair, prevent the bite, but their inability to keep cattle proves their inefficacy; the droppings of animals mixed with human milk and drugs, and smeared on the hide, often prove a temporary safeguard; an animal slightly bitten and escaping death will fall a victim to the next severe bite. With the destruction of the game, this insect, deprived of its food, may become extinct; and until it does, whole districts are rendered unable to keep cattle, horses, sheep, or dogs. It is found chiefly in the bush or among reeds, and rarely in the open country; it is confined to limited regions, which it never leaves, so that cattle may graze in quiet on one side of a river while the opposite bank swarms with tsetse. When obliged to pass through a country infested by them, the natives select a moonlight winter night, when they are torpid from cold. The flesh of animals bitten by the tsetse is not unwholesome, if they are killed before emaciation and weakness supervene. C. J. Andersson and Dr. Livingstone give extended accounts of the ravages of this insect.

TSURUGA, a city and seaport of Japan, in the province of Echizen, at the head of a bay of the same name on the W. coast of the main island, about 200 m. W. of Tokio; pop. about 20,000. It is almost the only good port on the W. side of the island, and attracts most of the junk and steamer trade. Its harbor is deep, spacious, and well protected. A canal connecting the bay with Lake Biwa, and thence through the Yodo river with the Inland sea, has long been projected by the government, and a railroad to Kioto and Osaka is now in progress (1876). The district around Tsuruga, which contains several large towns, is noted for its rice, silk, tea, paper, lacquer, and copper. Granite is quarried near the city, and lime is made in large quantities from marble.

TUAM, a town of Connaught, Ireland, in the county and 19 m. N. N. E. of the city of Galway, on both sides of the Harrow; pop. in 1871, 4,223. It contains both a Protestant and a Roman Catholic cathedral, the latter one of the finest churches in Ireland, the Roman Catholic college of St. Jarlath, several public schools, a monastery, a nunnery, and a workhouse. The manufactures are chiefly coarse linens. Tuam is a place of great antiquity, and had a cathedral founded by St. Jarlath in the 6th century. It is the see of a Roman Catholic archbishop, and was an archiepiscopal see of the established church till 1839, when it was reduced to a bishopric, with Killala and Achonry, suffragan to Armagh.

TUARIKS, or **Tuaregs,** a people supposed to be of the Berber race, occupying the desert of Sahara westward from Fezzan to the Atlantic. According to their own traditions, they came originally from Canaan. They are Caucasian in feature, and, though of dark complexion, have straight hair, and bear no resemblance to any of the negro races. They are bold, warlike, and predatory, and live chiefly on booty and tribute exacted from the caravans crossing their country. They are very zealous Mohammedans, and are governed by independent chiefs. They are divided into several tribes, the principal being the Azkar Tuariks. The Tibboos, who occupy the portion of the desert between Fezzan and Egypt, are considered a branch of the same family. The total number of the Tuariks is estimated at somewhat less than 200,000.

TUBERCLE. See CONSUMPTION.

TUBERCULOUS MENINGITIS. See BRAIN, DISEASES OF THE, vol. iii., p. 201.

TUBEROSE, a plant of the amaryllis family, *polianthes tuberosa*, cultivated for its fragrant flowers. The generic name, from the supposition that it refers to many flowers, is frequently written *polyanthes*, but it was given for the reason that it is especially a flower of cities (Gr. πόλις, a city, and ἄνθος, a flower). The common name is from the specific *tuberosa*, it having been called by the old French gardeners *plante tubereuse;* this is commonly corrupted into tube rose, and the plant spoken of as if it were a variety of the rose. It has a solid, pear-shaped tuber, from the base of which proceed roots, and from the apex long, linear, channelled leaves, and late in summer a stem 2 to 3 ft. high, the upper part of which is crowded with short-pedicelled flowers, and the lower part bears a few short leaves; the flowers consist of a funnel-shaped, slightly curved tube, with six nearly equal, spreading lobes, often tinged with rose without, creamy white within, with a powerful and, to some, oppressive fragrance; both single and double forms are cultivated. A few years ago an accidental variety appeared in the grounds of Mr. John Henderson, Flushing, N. Y., which has been called "the Pearl," and is of especial value in having the stem only about half the usual height, while bearing quite as many flowers. In a commercial view the tuberose is one of the most important of florists' plants; it is but a few years since the bulbs were all imported, some from Holland, but the finest from Italy; after a while it was found that they would grow as well in New Jersey as in Holland,

Double Tuberose (Polianthes tuberosa).

while those raised in Georgia and Florida are much larger and finer than any that can be produced abroad, and their culture is rapidly extending. The old tubers produce around the base numerous offsets, which serve for propagation; these are cultivated in rows, like onions, for one or two years, according to size, to make flowering bulbs, as they are called in the trade. To insure their flowering, the tubers should be stored where the temperature will not go below 50°, or the undeveloped flower buds may be killed. If the dry tubers are planted in the open ground in northern localities, the flowers are apt to be killed by frost, just as they are opening; to avoid this the bulbs should be put in boxes or pots of earth early in May, and placed in a greenhouse or warm window, where they will start, and then transferred to the open ground, after cold storms are over, in June. Botanists are not agreed as to the native country of the plant, some accrediting it to the East Indies and others to Mexico, but it must be treated like a native of the tropics. The flowers, both from being white and on account of their fragrance, are in great demand for bouquets and floral designs, and florists resort to every means to secure a supply during the winter. For early winter flowers, the plants that have not yet bloomed in the open ground are taken up and put in the greenhouse; and bulbs of the previous year's growth are carefully kept until August, when they are planted under glass. For forcing purposes the dwarf variety mentioned is especially valuable; the forced plants are rarely potted, but set in a bed of earth made upon the greenhouse bench. A tuber or bulb after it has once flowered is valueless.

TÜBINGEN, a town of Würtemberg, in the circle of the Schwarzwald, on the left bank of the Neckar, 18 m. S. W. of Stuttgart; pop. in 1872, 9,313. It has two new suburbs, an old *Stiftskirche* and several other Protestant churches, and a Roman Catholic church. The university, founded in 1477, has been distinguished since the 16th century in Protestant theology and in philosophy, and especially in the present century through the new Tübingen school of theology founded by F. C. Baur. In 1876 it had seven faculties, with more than 80 professors and other teachers, nearly 900 students, and about 40 distinct institutions, including the library in the Hohentübingen palace, with 200,000 volumes and 2,000 manuscripts.

TUCKAHOE, the aboriginal name of a curious subterraneous vegetable production, also called Indian bread and Indian loaf, found from New Jersey southward to the gulf and westward to Arkansas. It is in roundish masses, from the size of a pullet's egg to that of a cocoanut or much larger; its brownish surface resembles that of a loaf of coarse bread, while within it is a homogeneous whitish mass, with an earthy odor, and on drying cracks and becomes hard. It is usually found at planting time, when it is turned up by the plough, and presents no indications of having been attached to the roots of plants, or to a *mycelium*, as are most fungi. Under the supposition that it was a fungus, Clayton, and afterward Schweinitz, placed it with the puff-balls as *lycoperdon solidum*, and Fries called it *pachyma cocos;* but there is no reason for considering it a fungus, other than its underground manner of growth, and its somewhat distant exterior resemblance to the truffle (see TRUFFLE); on account of these it has been mistaken for the truffle. From the entire absence not only of reproductive organs, but of all cellular structure, and the lack of all knowledge of it in an early stage of its development, the tuckahoe has long been a puzzle to naturalists. About 30 years ago the late Prof. John Torrey made a chemical examination of it, and, while he was unable to detect by chemical tests the presence of starch, which the microscope had also failed to show, ascertained that the mass consisted almost entirely of pectin, which in some of its modifications is the jelly of fruits. It has been suggested by Berkeley and others that the tuckahoe is a secondary product, caused by the degeneration of the tissues of the root of some flowering plant, in which a change has occurred similar to that which converts animal tissues into adipocere, and that the cellulose and all other principles are transformed into a body of the pectose group; this is a conjecture only, against the probable truth of which is the fact that no intermediate states have been found, while none, large or small, present any trace of plant structure. The name tuckahoe is said to have been applied by the Indians to several edible roots, and indicates that they used this as food; it is employed in the southern states, boiled in milk, as a nutritious diet in diseases of the bowels, instead of arrowroot, and has been recommended in a medical work as a starchy food, while it contains no starch.

TUCKER, a N. E. county of West Virginia, touching Maryland on the northeast; area, about 400 sq. m.; pop. in 1870, 1,907, of whom 27 were colored. It is drained by Cheat river, a tributary of the Monongahela. The surface is broken and mountainous. The valleys are productive. The chief productions in 1870 were 1,469 bushels of wheat, 1,294 of rye, 27,813 of Indian corn, 14,726 of oats, 1,843 of buckwheat, 2,083 of potatoes, 6,093 lbs. of wool, 26,769 of butter, and 1,498 tons of hay. There were 493 horses, 637 milch cows, 1,084 other cattle, 2,608 sheep, and 1,045 swine. Capital, St. George.

TUCKER, Abraham, an English metaphysician, born in London, Sept. 2, 1705, died at his seat in Surrey, Nov. 20, 1774. He was educated at Oxford. In 1727 he purchased Betchworth castle, with a large estate, near Dorking, and there devoted himself to the study of agriculture. In 1754 he published the letters which had passed between himself and his wife, under the title "A Picture of Artless Love," and in 1755 a pamphlet against strong political feeling, entitled "The Country Gentleman's Advice to his Son on the Subject of Party Clubs." About this time he began his great work, "The Light of Nature Pursued, by Edward Search," four volumes of which were published in 1765; but a part of it had already appeared in 1763 under the title of "Free Will." In reply to a criticism on the work in the "Monthly Review," he wrote "Man in Quest of Himself, by Cuthbert Comment." He became blind in 1771, but continued to work upon his "Light of Nature Pursued," the remaining volumes of which were edited by his daughter, after his death. The best edition is that of Sir Henry Mildmay (7 vols. 8vo, 1805; 4 vols., Cambridge, Mass., 1831; 2 vols., London, 1852).

TUCKER, Josiah, a British clergyman, born at Laugharne, Carmarthenshire, in 1711, died in Gloucester, Nov. 4, 1799. He was educated at Oxford, took orders, and in 1749 became rector of St. Stephen's, Bristol, and in 1758 dean of Gloucester. He published "A Brief Essay upon the Advantages and Disadvantages which respectively attend France and Great Britain with regard to Trade" (1748); "The Case of going to War for the sake of Trade, considered in a new Light" (1763), a pamphlet, translated into French by Turgot; "A Treatise concerning Civil Government" (1781); and "Reflections on the Present Matters in Dispute between Great Britain and Ireland" (1785). At the American revolution he resisted the claims of the colonies, but opposed coercion, as he believed that the possession of colonies was detrimental to the interests of a country. In theology he published an "Apology for the present Church of England," "Letters to Dr. Kippis," "Religious Intolerance no part of the General Plan either of the Mosaic or Christian Dispensation," and "Seventeen Sermons on some of the most important Points of Natural and Revealed Religion."

TUCKER. I. St. George, an American jurist, born in the island of Bermuda, June 29, 1752, died in Nelson co., Va., in November, 1827. He was educated at the college of William and Mary, and studied law, but on the breaking out of the revolutionary war took up arms, and planned and aided in the capture of a large amount of stores in a fortification at Bermuda. In 1778 he married Mrs. Randolph, the mother of John Randolph of Roanoke. At the siege of Yorktown he was present as a lieutenant colonel. After the conclusion of the war he was elected a member of the general court, and was also law professor in William and Mary college. He was one of the commissioners to the convention of 1786 at Annapolis, Md., and recommended the convention of 1787 which framed the federal constitution. In 1803 he was appointed judge of the court of appeals, and in 1813 of the district court of the United States. He published "How far the Common Law of England is the Common Law of the United States;" "Dissertation on Slavery, with a Proposal for its Gradual Abolition in Virginia" (1796; new ed., New York, 1861); a letter on the "Alien and Sedition Laws" (1799); an annotated edition of Blackstone's "Commentaries;" and a volume of poems, including the well known and popular "Days of my Youth." **II. Henry St. George,** an American jurist, son of the preceding, born Jan. 5, 1781, died in Winchester, Va., Aug. 28, 1848. He received a liberal education, studied law, and became president of the court of appeals and professor of law in the university of Virginia. From 1815 to 1819 he was a member of congress. His works include "Lectures on Constitutional Law;" "Commentaries on the Laws of Virginia" (2 vols. 8vo, Winchester, 1836); and "Lectures on Natural Law and Government" (Richmond, 1843). **III. Nathaniel Beverley,** an American lawyer, brother of the preceding, born at Matoax, Va., Sept. 6, 1784, died in Winchester, Aug. 26, 1851. He was educated at William and Mary college, studied law, and in 1809 settled in Charlotte co., and in 1815 in Missouri, where he became a judge. From 1834 till his death he was professor of law in William and Mary college. He published a work on "Pleading," "Lectures on Constitutional Law," and novels entitled "George Balcombe" and "Gertrude." He left an unfinished novel called "The Partisan Leader," first published in 1837, and reprinted in New York in 1861, under the leading title "A Key to the Disunion Conspiracy."

TUCKERMAN, Henry Theodore, an American author, born in Boston, April 20, 1813, died in New York, Dec. 17, 1871. In 1833 and again in 1836 he went abroad, residing for some time in Italy and devoting himself to literature and art studies. In 1845 he removed from Boston to New York. He was a regular and frequent contributor to numerous periodicals, in which the bulk of his works originally appeared. He published "The Italian Sketch Book" (1835); "Sicily, a Pilgrimage" (1839); "Rambles and Reveries" (1841); "Thoughts on the Poets" (1846), devoted chiefly to masters of the English school (translated into German by Emil Müller); "Artist Life, or Sketches of American Painters" (1847); "Characteristics of Literature" (1849; 2d series, 1851); "The Optimist" (1850), a collection of miscellaneous essays; a "Life of Commodore Silas Talbot" (1851); "Poems" (1851); "A Month in England" (1853); "Memorial of Horatio Greenough" (1853); "Leaves from the Diary of a Dreamer" (1853); "Essays, Biographical and Critical" (1857); "Essay on Washington, with a Paper on the Portraits of Washington" (1859); "America and her Commentators" (1864); "A Sheaf of Verse" (1864); "The Criterion, or the Test of Talk about Familiar Things" (1866); "Maga: Papers about Paris" (1867); "The Book of American Artists" (1867); and "Life of John Pendleton Kennedy" (1871).

TUCKERMAN, Joseph, an American clergyman, born in Boston, Jan. 18, 1778, died in Havana, Cuba, April 20, 1840. He graduated at Harvard college in 1798, and from 1801 to 1826 was pastor of a Unitarian society in Chelsea. He then labored as a missionary among the poor of Boston. In 1812 he was instrumental in forming the first charitable society for the benefit of sailors in the United States, and subsequently the American seamen's friend society, and a "Benevolent Fraternity of Churches" for the support of a city mission, called the "Ministry at Large." He also visited Great Britain, and promoted similar organizations there. In 1830 he wrote a prize essay "On the Wages paid to Females." He published reports to the "Fraternity of Churches" (12mo, 1831; 2d ed., 1832), and "Principles and Results of the Ministry at Large."

TUCSON, a city and the capital of the territory of Arizona, county seat of Pima co., in lat. 32° 12′ N., lon. 110° 52′ W., 370 m. S. W. of Santa Fé, N. M., and the same distance E. by S. of San Diego, Cal., on the route between those places; pop. in 1870, 3,224; in 1875, about 5,000, three fourths of whom are of Mexican origin and speak Spanish. It is situated in the valley of the Santa Cruz river, 2,520 ft. above the level of the sea, about 55 m. S. of the Gila river and 60 m. N. of the Mexican boundary, and is the largest and most important place in the territory. It has the appearance of a Mexican town, with the customary plazas and narrow streets and houses built chiefly of adobe; but with the accession of American population an improvement is taking place. Camp Lowell, a United States military post, is 7 m. distant. There is only one church, Roman Catholic. Nine miles S. of the city is the church of San Xavier, built upward of a century ago by Catholic missionaries. Tucson has a designated United States depository and money-order post office, and an assay office; a commodious and well furnished public school building, with male and female departments and a large and increasing attendance; a seminary and school, under the charge of the sisters of St. Joseph; and a weekly newspaper. The territorial library contains 3,000 volumes. The climate is mild in winter and hot in summer, the average temperature of January being 51° and of July 89°. The business in 1875 amounted to $1,800,000, consisting chiefly in trade with the Mexican state of Sonora, and in supplying the military posts and Indian reservations of S. Arizona.—Tucson is within the "Gadsden purchase," obtained from Mexico by the treaty of Dec. 30, 1853. Its early history is unknown, but it has been a place of some importance for more than a century, and before its acquisition by the United States was a Mexican military post. It was incorporated in 1871.

TUCUMAN. I. A N. province of the Argentine Republic, bordering on Salta, the Gran Chaco, Santiago, and Catamarca; area, about 28,000 sq. m.; pop. in 1869, 108,602. In the west the surface is traversed by the Aconquija mountains, but in other directions there are extensive plains. The mountains abound in copper, silver, and other ores, but the mines are little worked. The most important rivers are the Salado, Tala, and Medinas. There are several shallow saline lakes, and in many places extensive tracts covered with fossil salt. The water of nearly all the streams is brackish. The climate of the plains is hot, but dry and healthful. The soil affords good crops of grain, sugar cane, tobacco, and fruits, and excellent pasturage. The chief exports are cattle and timber. **II.** A city, capital of the province, on the river Tala, in lat. 26° 51′ S., lon. 65° 15′ W., 675 m. N. W. of Buenos Ayres, on a plain 2,490 ft. above the sea; pop. in 1869, 17,438. The streets are regularly laid out but narrow, and most of the houses are of two stories and open into spacious interior courts. The principal church, fronting on the plaza, has two towers and a lofty dome; and there are several other churches, a Franciscan and a Dominican monastery, the college of San Miguel, and other institutions. There are tanneries, manufactories of leather work, and brandy distilleries. It took an important part in the war with Spain, and here, on July 9, 1816, a congress of the La Plata states met and issued a declaration of independence.

TUDELA (anc. *Tutela*), a city of Spain, in the province of Navarre, on the right bank of the Ebro at its junction with the Queiles and at the beginning of the Imperial canal, 156 m. N. E. of Madrid; pop. about 9,000. The Ebro is crossed here by a stone bridge with 17 arches. The Queiles passes through one of the principal squares, where bull fights take place; another square is surrounded by arcades. It has a highly ornamented cathedral, a medical college, and an orphan and foundling asylum. The exports include agricultural products, wool, oil, and wine resembling Burgundy. Few vestiges of the ancient fortifications remain. The Moors held the city from the 8th till early in the 12th century. The French under Lefebvre-Desnouettes were victorious here in June, 1808, and in November Lannes achieved a more decisive victory over Castaños in a battle fought chiefly on the heights above Tudela.

TUDOR, the surname of a line of English sovereigns, consisting of Henry VII., 1485–1509; Henry VIII., 1509–'47; Edward VI., 1547–'53; Mary I., 1553–'8; and Elizabeth, 1558–1603. The family descended from a Welsh gentleman, Owen ap Tudor, who married Catharine of Valois, widow of Henry V. One of their sons, Edmund, earl of Richmond, married Margaret, daughter and heiress of John Beaufort, duke of Somerset, whose father was an illegitimate son of John of Gaunt by Catharine Swynford. The offspring of this connection were afterward legitimated, but excluded from the succession. The only son of Richmond and the heiress of Somerset, Henry, duke of Richmond, on the extinction of the direct male line of John of Gaunt, was accepted by the Lancastrian party as their chief. He was invited over from France to deliver the country from the tyranny of Richard III., whom he overthrew at the battle of Bosworth in 1485, and became king. His marriage with Elizabeth, eldest daughter of Edward IV., in 1486, united the claims of the houses of York and Lancaster. The Tudors were bold, energetic sovereigns, and often despotic; and under them England was prosperous and powerful.—See "A Chronicle of England during the Reign of the Tudors, from 1485 to 1559," by Charles Wriothesley (vol. i., London, 1875).

TUDOR, William, an American author, born in Boston, Jan. 28, 1779, died in Rio de Janeiro, March 9, 1830. He graduated at Harvard college in 1796, visited Europe, and on his return founded the "Anthology Club," and contributed various articles to its journal, the "Monthly Anthology." In 1815 the first number of the "North American Review" appeared under his editorship, and three fourths of the first four volumes were written by him. In 1819 he published "Letters on the Eastern States;" in 1821 a volume of "Miscellanies;" and in 1823 a "Life of James Otis." In 1823 he was appointed United States consul at Lima, and in 1828 was made chargé d'affaires at Rio de Janeiro, where he wrote "Gebel Teir" (Boston, 1829). He was one of the founders of the Boston Athenæum.

TUESDAY, the third day of the week. In the Roman calendar it was called *dies Martis*, from Mars, and its present name is derived from Tiw, the Anglo-Saxon god of war.

TUFA. See Calcareous Springs.

TUFTS COLLEGE, an institution of learning in Medford, Mass., founded by Universalists. The corner stone of the original edifice was laid July 19, 1853, and the building finished in the spring of 1854. It is of brick, 100 by 60 ft., and three stories high. Besides this there are at present three large dormitories furnishing accommodations for 150 students. The college was named in honor of Charles Tufts, who gave it 70 acres of land for a site. Its total endowment now amounts to more than $1,000,000. The institution was opened in August, 1854. In 1867 the divinity school was organized. The first president was the Rev. Hosea Ballou, 2d, D. D., who died in 1861, and was succeeded by the Rev. Alonzo A. Miner, D. D., LL. D. Dr. Miner resigned in 1876, and was succeeded by the Rev. Elmer Hewitt Capen. In the college department there are two parallel courses of four years each. The first is the usual college course, for which the degree of bachelor of arts is given. The second resembles the first, but gives more scope to elective studies, and permits the substitution of the modern languages for Greek. For this course the degree of bachelor of philosophy is given. There is also an engineering course of three years. The full course in the divinity school is three years for bachelors of arts and four years for others; but students are admitted for shorter periods. For theological students tuition and room rent are free. The library of the college contains more than 16,000 volumes and 5,000 pamphlets. The museum contains good collections of minerals, shells, birds, and botanical specimens. In 1875–'6 the collegiate department had 10 professors, 1 instructor, and 73 students, viz.: classical course, 56; engineering, 12; philosophical, 2; resident graduates, 3. The divinity school had 3 professors, 1 instructor, 3 lecturers, and 23 students. The number of graduates of the college was 225; of the divinity school, 21.

TUI. See Poë Bird.

TUILERIES, a royal palace in Paris, between the Seine and the rue de Rivoli, and E. of the Place de la Concorde, so named because it stood on the site of a former manufactory of tiles (Fr. *tuilerie*). It was commenced in 1564 by Catharine de' Medici, who built the central *pavillon de l'horloge*, and the two adjoining wings and their pavilions. Henry IV. added a range of buildings with a lofty pavilion at each end, the whole presenting a façade 336 yards in length by 36 in depth. He also commenced the gallery fronting the Seine connecting the S. extremity of the building with the Louvre, continued by Louis XIII., and finished by Louis XIV. The latter replaced the spherical dome of the *pavillon de l'horloge* by a quadrangular one; and in 1808 Napoleon I. began the northern gallery along the rue de Rivoli, which was completed by Napoleon III., when the Tuileries and the Louvre formed a connected pile, enclosing the Place du Carrousel. The front of the building was imposing, and the interior unsurpassed in magnificence by any other royal residence. After the removal of the court to the palace of Versailles in 1672 no French king lived in the Tuileries until 1789, when Louis XVI. was compelled to remove thither. On Aug. 10, 1792, the people stormed the building and massacred the Swiss body guard. It was the residence of Napoleon during the consulate and empire, and of the Bourbons after the restoration. In July, 1830, it was again taken by the people; and at the expulsion of Louis Philippe in February, 1848, it was for the third time ransacked. It was the residence of Napoleon III., who renovated and greatly improved it. The palace itself, with a small part of both extensions connecting with the Louvre, was destroyed by fire by the communists in May, 1871. The gardens of the Tuileries, extending west to the Place de la Concorde, comprising 50 acres, and among the most attractive public resorts in Paris, suffered severely during the war of 1870–'71, but in 1876 had been thoroughly restored.

TUISCO, Thuisco, Tuisto, or **Teut,** the god whom, according to Tacitus, the ancient Germans revered as the earth-born founder of their nation. He was represented as a gray-bearded man, with uncovered head clad in the skin of an animal, holding a sceptre in his right hand, and stretching out the left. His son Mannus was the father of the progenitors of the three principal tribes.

TULA. **I.** A central government of Russia, bordering on Moscow, Riazan, Tambov, Orel, and Kaluga; area, 11,955 sq. m.; pop. in 1870, 1,167,878. The surface is generally flat. The most important rivers are the Oka, Upa, and Don, the two latter of which are connected by the Ivanovska canal, which forms part of the system that unites the Baltic, Black, and Caspian seas. The soil is fertile, and about two thirds of the surface is cultivated. Iron and woollen and linen goods are manufactured. **II.** A city, capital of the government, on the Upa, 107 m. S. of Moscow; pop. in 1867, 58,150. It has an extensive cannon foundery and manufactory of arms, established by Peter the Great, and upward of 800 private firearms and cutlery workshops.

TULARE, a S. E. county of California, extending from the summit of the Sierra Nevada on the northeast to the summit of the Monte Diablo range on the southwest, and drained by Kern river and several streams that flow into Tulare lake; area, 5,600 sq. m.; pop. in 1870, 4,533, of whom 99 were Chinese. Tulare lake, over 30 m. long and about 20 m. wide, is in the S. W. part. Its valley is fertile. Some gold is found, but the mines are little developed. Agriculture and grazing are the chief pursuits. The Visalia division of the Central Pacific and the Tulare division of the Southern Pacific railroad traverse it. The chief productions in 1870 were 53,605 bushels of wheat, 9,750 of Indian corn, 85,110 of barley, 8,685 of potatoes, 660,645 lbs. of wool, 37,490 of butter, and 4,419 tons of hay. There were 4,590 horses, 36,167 cattle, 147,301 sheep, and 15,403 swine; 3 flour mills, and 3 saw mills. Capital, Visalia.

TULIP (Pers. *thulyban;* written *tulipan* by the old authors, and Latinized as *tulipa*), a genus of plants of the lily family, of which numerous cultivated forms are derived from several distinct species, all natives of the old world. They have a coated bulb, from which appears in spring a one- to three-leaved stem, terminated by a single, erect, large, showy flower; the six parts of the flower are separate, broad, and not spreading; six stamens with erect anthers, and a triangular ovary, with sessile stigmas, which ripens into a similarly shaped, three-celled, and many-seeded pod. The garden, florists', show, or late tulips, as they are variously called, are from *tulipa Gesneriana*, the species being named in honor of Gesner, who described the plant in 1559 from specimens raised from seed sent from the Levant; the stems are taller than in any other species (about 30 in.), with the divisions of the flower very obtuse, and in the wild state marked with yellow and violet. The cultivation of this plant rapidly spread in the Netherlands, and almost innumerable varieties were obtained from seed; that country is still the centre of the culture of this and many other bulbs, and supplies the rest of the world. About the middle of the 17th century the tulip became the object of a remarkable commercial excitement or mania, and the bulbs were bought and sold at such enormous prices (the equivalent of $6,000 was paid for a single bulb) that the government was forced to limit the price for any one bulb to 200 francs; these extraordinary sales were not always real, with a transfer of the bulb, but they served to speculate upon, like stocks in the exchange. So great has been the change in popular taste that at present, in this country at least, it is very rare to see a bed of choice named varieties of show tulips. The fanciers make several classes, the principal of which are: bybloemens, in which the flowers have a white ground broken with various shades of purple and other colors; bizarres, with a yellow ground, variegated with other colors; Baguets, with the flowers white at base and broken with rich brown; incomparable Verports, with cherry or rose ground, white bottoms, and marked with shining brown. Breeders are bulbs raised from seed which are at first selfs, or all of one color, without any variegation whatever; by continuous cultivation they finally "break," or become variegated, the time varying from one to 20 years, and even at the end of the longer period the result may be worthless. These late tulips bloom in the northern states about the last of May, but there is a set of varieties which bloom three weeks earlier. These are from *T. suaveolens* of southern Europe, with stems less than a foot high, and acute petals; one of the most valued of these is "Duc Van Thol," usually red bordered with yellow, and presenting several subvarieties. There is a long list of named early sorts, from pure white to dark violet, with innumerable variegations; there are also double varieties of these, which are not pleasing singly, but planted in clumps make brilliant masses of color. The parrot tulips are varieties or crosses of *T. Turcica*, from Turkey; they are of dwarf habit, the petals curved and fantastically fringed, and colored with yellow, red, and a large admixture of green; the form and coloring readily suggest the popular name. A few species, little if any changed by cultivation, are sometimes seen in gardens; among these are *T. cornuta*, with singularly attenuated petals, *T. oculis solis*, vermilion, with a deep violet (called black) eye, and others. The bulbs are imported each autumn in large quantities from Holland. A perfect and mature bulb contains a well developed bud, which the next spring will

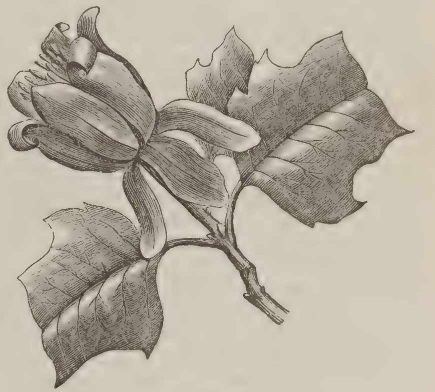
Early Tulip, Duc Van Thol.

rapidly push up and produce leaves and flower; it also contains, between the scales, another bud, which during the brief growing season, while the first named is blooming, will increase rapidly, replacing that, and be ready to bloom the next year; besides these, the bud of a third generation may be found, ready in time to take the place of the second bud. When a tulip bulb is planted, it produces its flower and leaves; its foliage, after flourishing for a while, suddenly dies off, and a bulb may be dug up apparently like the one planted; but that has been expended in producing the flower, and this bulb is due to the increase of the second or replacing bud, which will be found to contain the rudiments of next spring's bloom. At the base of the bulb appear small offsets or bulblets, which, if broken off and cultivated for several years, will grow to a flowering size, and reproduce the peculiar variety; in Holland the number of these bulblets is increased by cutting off the flower buds as soon as they appear.—In careful tulip culture, the bed is made very light and rich, and the bulbs are set in October, 8 in. apart and 3½ in. deep; some take pains to envelop each bulb in sand; the bed is covered with litter, and left until spring, when it is uncovered; as the flowers are about to open, the bed is covered with an awning of cotton cloth, to prevent the sun from injuring the flowers, and thus prolong their duration; when the bloom is over, the seed vessels are cut off, and the plants cultivated until the leaves fade, which they will do in a few weeks, when the bulbs are taken up, dried, and kept in a cool, dry place until time to plant again. Early sorts are often left in the ground year after year; and though they do not give so fine a bloom as when the bulbs are lifted, they make acceptable spring flowers. Like other bulbs, tulips are readily forced in the greenhouse or in window culture (see HYACINTH); the early sorts are preferred for this, and three bulbs may be put into a six-inch pot.

Parrot Tulip.

Late or Show Tulip.

TULIP TREE, the popular name for *liriodendron tulipifera*, a large tree of the magnolia family; one of its distinctive characters, its large and showy flowers, being recognized in its botanical and common names. The genus (named from Gr. λίριον, a lily, and δένδρον, a tree) is exclusively American, and includes only this species. It is found from Canada to Florida, and is more abundant in parts of the west, as Michigan and southern Illinois, than at the east; with the exception of the buttonwood, it is the largest of our deciduous trees, reaching the height of 140 ft., with a diameter of 8 or 9 ft. The bark on young branches is light brown and smooth, but on old trees it is much broken by longitudinal fissures. In spring the development of no tree can be studied with greater interest; as the large leaf buds open they are found to be covered by two stipules, coherent by their edges to form a sac, and beneath these the young leaf, to which they belong, will be found closely folded, and its petiole bent over; beneath this is another leaf similarly covered and packed away, and so on; as the leaf develops, the stipules increase in size, and soon fall away, leaving a scar just above the petiole. The leaves, on long petioles, are 4 in. or more across, with two lobes near the base and two at the apex, where the leaf appears as if it had been abruptly cut off, leaving a very broad, shallow notch. The flowers are solitary and terminal; the bud is enclosed by a sheath which is pushed off as the flower opens; they consist of three long


Tulip Tree (Liriodendron tulipifera).

reflexed sepals, and six petals, which are arranged in two rows, to form a bell-shaped corolla, 2 in. or more long, within which are numerous stamens, surrounding a cone-like mass of pistils crowded upon a long slender axis. In fruit the pistils ripen into woody one- or two-seeded keys, which fall away from the axis. The petals are greenish yellow, marked with orange, and have an orange spot at the base. The bark, especially that of the root, is bitter and aromatic, and sometimes used as a stimulant tonic. The wood, often called white wood, though it becomes yellowish upon exposure, is soft and easily worked, and is put to almost as many uses as that of the white pine; it is easily bent to any required shape, which makes it useful in building circular staircases and other curved work; it is much employed in carriage building for panels, and in cabinet work, especially for drawers. In localities where it is the most available timber, it is employed in building. The western lumbermen almost invariably call the tree poplar ("popple") or yellow poplar; an unfortunate misnomer, as it has no resemblance to or botanical relationship with the poplars. The tulip tree is pleasing when young, and when full grown forms a very stately object. There are several varieties in which the leaves deviate from the usual form, and one in which they are handsomely variegated with yellow; but the markings do not hold under our hot suns. Trees transplanted from the woods, unless they are very small, do not succeed, and this has given the impression that the tree is difficult to manage. It is easily raised from seeds, and nursery trees, produced in this way and transplanted a few times, may be removed without difficulty.

TULL, Jethro, an English agriculturist, born about 1680, died in January, 1740. He owned an estate near Hungerford, on the borders of Oxfordshire and Berkshire, and observing the advantage of cultivation of plants in rows, and of stirring and pulverizing the soil between them, he introduced this system of cultivating the soil. But he adopted the erroneous principle that manure was not essential, as finely pulverized earth and moisture were sufficient for the growth of plants. This ruined him, and brought discredit upon his system. He published a treatise on his new mode of cultivation (1731), and detached essays, which were collected in 1751, and republished by William Cobbett in 1822. (See AGRICULTURE, vol. i., p. 203.)

TULLE, a town of France, capital of the department of Corrèze, and formerly of Lower Limousin, at the junction of the Solane with the Corrèze, 115 m. E. N. E. of Bordeaux; pop. in 1872, 11,848. It has fine quays and promenades, a suburb, many bridges, a cathedral remarkable for its tower, and a celebrated government factory of firearms. Among its manufactures are paper, playing cards, nails, leather, and coarse woollens; and it has a trade in horses, game, and neatsfoot oil.

TULLIUS, Servius. See SERVIUS TULLIUS.

TULLOCH, John, a Scottish clergyman, born at Tibbemuir, Perthshire, in 1822. He was educated at the university of St. Andrews, and in 1844 was ordained a minister of the church of Scotland, with a charge at Dundee. Afterward he visited Germany, and studied speculative theology. In 1849 he removed to the parish of Kettins in Forfarshire, and in 1854 was appointed principal of St. Mary's college in the university of St. Andrews, which office he still holds (1876). In 1855 he received a Burnett prize of £600 on the "Being and Attributes of God." He has published "Leaders of the Reformation" (1859); "English Puritanism and its Leaders" (1861); "Beginning Life: Chapters for Young Men" (1862); "The Christ of the Gospel and the Christ of Modern Criticism: Lectures on M. Renan's *Vie de Jésus*" (1864); and "Rational Theology and Christian Philosophy in England in the Seventeenth Century" (2 vols., 1872).

TULLUS HOSTILIUS, the third king of Rome, said to have reigned from about 673 to about 641 B. C. The most memorable event of his reign, according to the legend, is the war with Alba, celebrated by the combat between the Horatii and the Curiatii, and the consequent acknowledgment by the Albans of Roman supremacy. In the war against Fidenæ, an Alban army was led to the assistance of Rome by Mettus Fuffetius, the Alban dictator, who intended to go over to the enemy at the critical moment. Tullus discovered the treachery, had the traitor torn in pieces from chariot wheels, razed Alba to the ground, and transferred the inhabitants to Rome, where the great mass of them became the Roman *plebs*. After these successes Rome was afflicted with a pestilence, and the king himself was seized with the disease. Having found the formula with which Numa had sacrificed to Jupiter Elicius, he attempted to call down the god, but fell into an error, and the god destroyed the king and his household by lightning.

TULLY, William, an American physician, born in Saybrook, Conn., Nov. 18, 1785, died in Springfield, Mass., Feb. 28, 1859. He graduated at Yale college in 1806, studied medicine, and in 1808 settled at Milford, Conn. He removed about 1815 to Upper Middletown, now Cromwell, Conn., where he became intimate with Dr. Thomas Miner, whose views in relation to the nature and treatment of spotted fever he adopted; and in 1823 he published with him the essays known as "Miner and Tully on Fever." In 1824 he was elected president and professor of materia medica in the medical institution at Castleton, Vt. In 1827 he removed first to Albany, and afterward to Castleton. He was professor of materia medica in the medical institution of Yale college from 1830 to 1841, when he resigned. In 1851 he removed to Springfield, Mass., where he prepared a work on materia medica (vol. i. in 2 parts, Springfield, 1857-'60).

TULTCHA, or **Tultsha** (anc. *Ægissus*), a town of Bulgaria, on the right bank of the Danube, 6 m. above the junction of its Sulina and St. George's arms, 12 m. S. S. W. of Ismail, and 45 m. W. of Sulina; pop. variously estimated between 13,000 and 20,000. It is a port of considerable commercial importance. The former fortress was damaged by the Russians in 1789 and 1791, and utterly destroyed in 1828, after which the present town was laid out. It was occupied by the Russians during the spring of 1854. Darius crossed the Danube in the vicinity of ancient Ægissus in his expedition against the Scythians.

TUMOR (Lat. *tumere*, to swell), an excessive growth of tissue confined to a limited region, not inflammatory. Tumors are described as "benign" or "malignant," as "homologous" or "heterologous." A benign tumor is one which does not, except by its mechanical action, interfere with life, and has generally no tendency to recur after removal. A malignant tumor is one produced by or inducing a constitutional taint, and usually reappearing after removal. A homologous tumor is one the structure of which is like tissues normally existing in the body. A heterologous tumor is one composed of tissues unlike to those normally present. Though a foundation of truth lies in this nomenclature of sufficient strength to have misled most physicians, our present knowledge of the histology and clinical histories of these growths has clearly shown that these distinctions are erroneous. The extremes are well marked, but the boundary line is irregular or confused. To what the growth of tumors can be ascribed is undetermined. That it is due to a perverted nutrition is certain, but how or why cannot be explained. The exciting cause is always mechanical, either from without or within the body; the predisposing cause, apart from heredity or mal-nutrition, specific or of other character, is obscure. With such a knowledge of tumors, an accurate classification is impossible, but one can be made which will greatly assist in the diagnosis, prognosis, and treatment of these growths, and also in the examination of their minute structures, viz.: 1, cystic tumors; 2, those made up of simple or composite tissues, aggregated or arranged as usually found in the adult body; 3, those made up of simple tissues, aggregated or arranged in a manner deviating widely from the normal, the cell element largely predominating. A cystic tumor is one having a limiting membrane which exists normally, or is formed by a condensation of surrounding tissue, or is a production of new tissue. The contents may be fluid or solid. Housemaids' knee is an example of a fluid cystic tumor, the limiting membrane of which exists normally. The sebaceous tumor of the scalp is an example of one which is solid, produced by an obstruction in its duct to the secretion of a gland. A blow on the head may cause an effusion of blood beneath the scalp, which, by its outward pressure and irritation, can produce and excite the formation of a cyst wall. In this class will be comprised most ovarian tumors, kidney cysts, congenital tumors containing hair, &c. To the second class belong all tumors of a fibrous, fatty, or cartilaginous nature, either alone or combined, and those made up of composite tissues, such as the vascular and glandular tumors. To the third class belong such growths as consist mainly of cells, or of cells mingled with other tissues in an irregular and abnormal manner: tubercle, sarcoma, cancer, &c. Making use of the terms employed in the nomenclature mentioned above, tumors in the first and second classes are homologous and generally benign; those in the third class are heterologous and as a rule malignant.—The chief interest, as regards prognosis, centres upon tumors of the third class. Opinion is divided as to whether cancer, using this term in its common signification, and taking this member of the class as the most important surgically, is primarily a local disease affecting the constitution only secondarily, or whether it is merely the local manifestation of a preëxisting constitutional taint.

TUNBRIDGE, or **Tonbridge**, a market town of Kent, England, on the Tun, near its entrance into the Medway, 11 m. S. W. of Maidstone; pop. in 1871, 8,209. It consists for the most part of one long and well built street, and contains six churches, an endowed grammar school lately rebuilt, and several literary and charitable institutions. There are ruins of a gateway flanked by round towers, once belonging to the castle built by the first earl of Clare and Hertford in the 11th century. The refectory of a priory founded by the same earl is still standing. Tunbridge has manufactures of gunpowder and fancy wooden wares, and a considerable trade in coal and lumber.

TUNBRIDGE WELLS, a market town of Kent and Sussex, England, in a beautiful country, 15 m. S. W. of Maidstone; pop. in 1871, 19,410. It is a fashionable watering place, and consists chiefly of clusters of houses on detached eminences, and of a parade paved with pantiles in antique style, and lined with fine trees on one side, and on the other with assembly rooms, libraries, and shops. The surrounding country abounds in mineral springs. The one to which the place owes its origin is a light pure chalybeate, and the water is considered remarkably efficacious in cases of weak digestion.

TUNGSTEN (Swed. *tung*, heavy, and *sten*, stone), a metal existing in the form of an acid combined with lime in the mineral scheelite or tungstate of lime, and also combined with iron and manganese in the mineral wolfram. Tungstic acid was discovered by Scheele in 1781, and metallic tungsten two years later by the brothers D'Elhujar. Its German name *Wolframium* gives its symbol, W. It is obtained as a heavy iron-gray metal, very hard and difficult of fusion, and of the high specific gravity 17·6, by intensely heating tungstic acid made into a paste with oil, in a crucible lined with charcoal, for some hours. The tungstic acid is procured by decomposing the tungstate of lime with hydrochloric acid, which dissolves the lime and leaves the tungstic acid. The chemical equivalent of tungsten is 184.—Tungsten combines with several other metals, forming alloys of interest. Its combination with cast iron is remarkable for its extraordinary hardness; and it is said that cast steel containing 10 per cent. of tungsten is greatly improved in tenacity, hardness, and susceptibility of taking a fine temper. Notwithstanding its reputed qualities, tungsten steel has not been generally introduced, and comparatively little is made.—Of the two oxides of tungsten, WO_2 and WO_3, the latter only, or tungstic anhydride, is of particular interest. This occurs native in bright yellow cubes, also as an earthy substance like ochre at Lane's mine, Monroe, Conn., Cabarrus co., N. C., and a few other places. But the usual form of the acid is in the combinations already named, and of these wolfram is the most common ore of the metal. This is a brownish black mineral, of metallic lustre, of hardness 5 to 5·5, and specific gravity 7·1 to 7·55. It is often found associated with tin ore in Cornwall, Saxony, Bohemia, and France. In the United States it has been found at Monroe, Conn., with native bismuth, galena, blende, &c.; also at Trumbull in the same state, and near Mine La Motte, Mo., and Blue Hill bay, Me. Tungstic acid is also found in combination with lead, forming the mineral scheeletine, and artificial tungstate of lead is prepared as a pigment resembling white lead. The following are some of the attempted applications of the compounds of tungsten to economical purposes: tungstic acid for coloring yellow; oxide of tungsten for coloring blue; tungstate of soda in dyeing and calico printing, and as a substitute for stannate of soda. The compounds of tungsten have been thoroughly studied by Roscoe and Zettnow, but none of them possess particular interest beyond those already described.

TUNGUSES, a tribe of N. E. Siberia, of Mongolian origin, extending as far W. as the Yenisei and as far E. as Anadyrsk, in lon. 171°. They number about 70,000. Among their allied tribes are the Monzhurs and the Gilyaks and others of the Amoor. The Mantchoos belong to the Tungusic stock. The Tunguses proper and their congeners the Lamuts are well disposed, and mostly belong to the Greek church and pay tribute to the czar. They are generally divided into reindeer, horse, and dog Tunguses; but they are chiefly devoted to the reindeer, which they use for riding and for carrying freight, while other tribes use them chiefly in sledges. The Tunguses and the Lamuts are very slender, and have dark olive complexions, no beards, straight black hair, and oblique eyes. Men and women wear almost the same rich costume of fur hoods and pantaloons, short deer-skin boots, and highly ornamented buckskin aprons. They differ greatly from the Tchuktchis and Koriaks, though leading the same nomadic life; while among the latter there are men owning thousands of reindeers, one possessing 300 would be deemed immensely rich among the Tunguses. Unlike most other tribes, they never break up their tents without leaving a pole as a landmark for resuming the same habitation on returning from their wanderings. The Russian traders of the sea of Okhotsk derive most of their supply of Siberian squirrel skins for the European markets from the Tunguses and Lamuts in that region.

TUNICA, a N. W. county of Mississippi, bordering on the Mississippi river, which separates it from Arkansas, and intersected by the Coldwater river and other streams; area, 750 sq. m.; pop. in 1870, 5,358, of whom 4,127 were colored. The surface is flat, and in many places swampy, and the soil fertile. The chief productions in 1870 were 4,500 bushels of wheat, 2,000 of oats, 1,500 of barley, 82,155 of Indian corn, and 6,424 bales of cotton. There were 240 horses, 645 mules and asses, 413 milch cows, 1,409 other cattle, 33 sheep, and 1,812 swine. Capital, Austin.

TUNICATES. See MOLLUSCOIDS.

TUNIS. **I.** One of the Barbary states of N. Africa, bounded N. and E. by the Mediterranean, S. E. by Tripoli, S. by the desert of Sahara, and W. by Algeria, between lat. 32° 20′ and 37° 20′ N., and lon. 7° 20′ and 11° 30′ E.; extreme length about 350 m., general breadth 130 m.; area, about 45,000 sq. m.; pop. about 2,000,000. Besides the capital, of the same name, the chief towns are Kairwan, Susa, Hammamet, Bizerta, Kef, and Sfax. The coast line is irregular, and has three extensive indentations, forming the gulfs of Tunis, Hammamet, and Cabes (Syrtis Minor). The only considerable river is the Mejerda (anc. *Bagradas*), which falls into the gulf of Tunis after a N. E. course of about 200 m. Near its mouth, and for some distance W. of it, are several large lagoons. The Shot Kebir (anc. *Palus Tritonis*), over 100 m. long, and the Shot Gharnis, further W., over 50 m. long, in the southern part of the country near the Sahara, are marshy depressions which become nearly dry in summer. The interior of Tunis is but little known. The N. W. portion is mountainous, the summits having a height in many places of 4,000 or 5,000 ft. The mountains are well timbered, and have many tracts of cultivated land and olive plantations on their lower slopes. An extensive plain or table land, 100 m. long by 30 m. broad and quite level, extends from this region to the gulf of Hammamet; it is nearly destitute of trees, and is used by the Arabs for pasturing their horses and camels. S. of this plain the country is believed to be nearly desert, though in ancient times it was celebrated for its fertility. Silver, lead, and copper are found in the mountains. The climate is very healthful; rain falls at intervals between November and April, but droughts prevail during the rest of the year. Wheat, barley, and maize are raised, but dates furnish a great part of the subsistence of the inhabitants. Olives, tobacco, cotton, indigo, and various drugs and dyes are grown; and the fruits of southern Europe are abundant. The principal domestic animals are horned cattle, mules, and camels; the breed of horses, once famous, has been allowed to degenerate. The tunny and sponge fisheries on the coast are important. The lion, panther, lynx, ounce, wolf, and boar are the principal wild animals found in the country.—The people of the interior are principally Arabs and Kabyles, while those of the coast comprise Turks, Moors, Jews, and Christians, with various degrees of mixture. They are generally good-looking, but very ignorant. The language is a dialect of Arabic, but an Italian idiom is used by the traders. The Arabs resemble the Bedouins of Arabia in their mode of life, but are inhospitable to strangers. The Kabyles live on the mountains in villages of rudely constructed huts, and subsist chiefly on dates, bread, and milk. Arms are carried by all classes, and on the borders of Algeria the inhabitants do not acknowledge allegiance to either government. The religion is strict Mohammedanism. The principal manufactures are woollen fabrics, particularly the red caps so much worn along the shores of the Mediterranean; considerable numbers of skins are tanned and dyed; and trade is carried on with Europe and the interior of Africa. The government of Tunis, though nominally dependent on Turkey, and called a regency, is in reality a perfectly independent and absolute despotism. The sovereign is known as the bey. He pays no tribute, but is nominally restrained from making war or ceding territory without the consent of the sultan. The Turkish law of succession to the throne prevails. There are many ancient ruins in different parts of Tunis, more particularly in the valley of the Mejerda, where at Dukhah (anc. *Thugga*) are temples, an arch, cisterns, baths, barracks, gates, theatres, an aqueduct, and many inscriptions. The great aqueduct which conveyed the water 52 m. from the mountain of Zagwam to Carthage can still be traced along the whole line, while some remaining portions rise to the height of 98 ft.—Under the Romans this country formed the province of Africa, and was divided into Zeugitana in the north and Byzacena in the south; and its most important cities were Carthage, Utica, Hippo Zarytus (Bizerta), Hadrumetum, Leptis Minor, Thapsus, and Zama. In A. D. 429 it was taken by the Vandals, and a century afterward became subject to the Greek empire, under which it remained till N. Africa was overrun by the Mohammedans in the latter part of the 7th century. Early in the 13th century it became independent. Louis IX. of France in 1270 made an unsuccessful crusading expedition against it, and died before the capital. In 1535 Charles V., after defeating the pirate Khair ed-Din Barbarossa and capturing Goletta and the city of Tunis, made the country tributary to Spain; but in 1574 it was conquered by the Turks. The Moors ultimately enforced their right of electing their own bey, agreeing only to pay a certain tribute to the sultan at Constantinople. The pirates of Tunis subsequently became very daring, but in Cromwell's time received severe chastisement from the British under Admiral Blake, and afterward from France and Holland. In 1816 the Tunisians agreed to renounce piracy and Christian slavery. Under Ahmed Bey (who succeeded in 1837) and his successors, Mohammed Bey (1855) and Mohammed Sadyk Bey (1859), various reforms were effected, including the suppression of the slave trade and of many monopolies and oppressive taxes, the establishment of military conscription and of mixed tribunals, and the creation of a municipal government for the capital. French influence has long been predominant in the country. **II.** A city (anc. *Tunes* or *Tunis*), capital of the state, on the W. side of a lagoon near the mouth of the river Mejerda, connected with the gulf by the narrow channel of Goletta, 400 m. E. of Algiers, in lat. 36° 46′ N., lon. 10° 9′ E.; pop. estimated at 120,000. It is surrounded by a double wall 5 m. in circuit, and defended by a strong castle, which commands the approach from the sea, and by several forts. Its appearance from a distance is imposing, but the streets are narrow and dirty, and the houses generally consist of a single story without windows on the exterior. The town is well supplied with water. Among

The Bey's Palace, Tunis.

the principal buildings are the bey's palace, many handsome mosques, and several large barracks, one of which has room for 4,000 men. There are Moorish schools and a college, a Roman Catholic church and convent, a Greek church, a theatre, and public baths and bazaars. The leading manufactures are woollen cloths and caps, embroidery, leather, and essences of musk, rose, and jasmine. The trade is extensive, comprising exports of oil, caps, soap, grain, wool, hides, cattle, sponges, wax, gold dust, and ivory, and imports of cotton, linen, and woollen goods, tin, lead, iron, coffee, sugar, and spices. The depth of water at Tunis is only 6 or 7 ft., and vessels lie in the gulf and discharge by lighters. In 1873, 1,272 vessels of 121,957 tons entered the port. Tunis is not far from the site of ancient Carthage, and is itself a place of great antiquity.

TUNKERS. See DUNKERS.

TUNNEL, a subterranean or subaqueous way, constructed for purposes of passage. In mining, the term is often applied to horizontal excavations, especially to such as are known by the designations gangway, heading, drift, and adit, used as underground roads or for the passage of water. (See ADIT.) Herodotus mentions a tunnel in the island of Samos, cut through a mountain 150 orygia (900 ft.) high. Its length was seven stadia (4,247 ft.), and its cross section 8 ft. high by 8 ft. wide. In Bœotia a tunnel was constructed for the drainage of Lake Copais. When Cæsar arrived at Alexandria, he found the city almost hollow underneath from the numerous aqueducts; every private dwelling had its reservoir, supplied by subterranean conduits from the Nile. The aqueducts of the ancient Romans, and of the Peruvians and Mexicans, included remarkable tunnels. (See AQUEDUCT.) Among the many Roman aqueducts on which tunnels were built were the Aqua Claudia, of which 36½ m. passed underground; the Aqua Appia, built in 312 B. C., 11,190 Roman paces in length, 11,130 being underground and arched; and the Aqua Virgo, 14,105 paces long, 12,865 underground. A tunnel was begun in 398 B. C. to tap Lake Albanus, at the instance, Livy tells us, of the oracle of Delphi. It was 6,000 ft. long, 6 ft. high, and 3½ ft. wide. Fifty shafts were sunk on its line, and the work was finished within one year, though it was driven through the hardest lava. A similar work of greater magnitude was undertaken to connect Lake Fucinus (now Celano) with the river Liris (now Garigliano); 30,000 men were employed on it for ten years, and it was finished at a vast expense A. D. 52. A minute account of the modern clearing out of this work by the Neapolitan government may be found in "Blackwood's Edinburgh Magazine," vol. xxxviii., p. 657. The accuracy of the surveying in these works is astonishing when we consider the rudeness of the instruments. Among those used in levelling by the Romans were the *libra aquaria* and *dioptra*, of which we have no clear description. The *chorobates* seems to have been preferred. It consisted simply of a rod or plank about 20 ft. long, mounted on two legs, at its extremities, of equal length. The rods or legs were secured by diagonal braces, on which were marked correctly vertical lines. A plumb line attached at each extremity, and passing over these diagonal braces, indicated whether the instrument was level. When the wind prevented the plumb bobs from remaining stationary, a channel in the upper edge of the horizontal rod was filled with water, and if the water touched equally both extremities the level was supposed to be correct; and then the observation of the descent or elevation of the ground was made with accuracy.—Tunnelling might be classed under four general heads: 1, ancient tunnelling, to which we have just referred; 2, modern tunnelling through soft ground (clay deposit, &c.) and loose rock, requiring arching; 3, modern tunnelling through solid rock before the introduction of machinery; 4, modern tunnelling through solid rock with the aid of machinery. The art of tunnelling at the present day constitutes a profession in itself, new developments succeeding each other with great rapidity. Figs. 1 and 2 show cross sections that may be adopted in tunnelling: fig. 1 through rock tenacious enough to require no artificial support; fig. 2 where arching may be found necessary. These examples are from plans adopted in the construction of the Musconetcong tunnel, New Jersey, on the Lehigh Valley railroad extension, finished in 1875.—*Tunnelling through Soft Ground.* Under the designation "soft ground," technically so called, the miner includes all such material as clay, earth deposit, &c., which, if tunnelled through, requires a temporary timber arch to

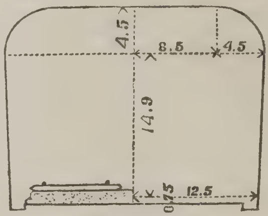


FIG. 1.

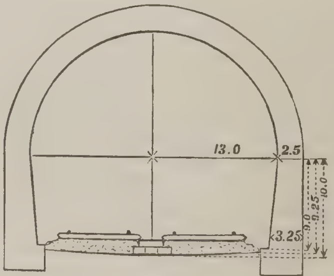


FIG. 2.

hold it in place, until the permanent brick or stone arching is built. Loose rock, as its name indicates, is rock either so seamy and broken by folding or compression, or so disintegrated, as to require an arch, generally much lighter than those necessary in soft ground. According to the method generally adopted in driving a tunnel through soft ground, the first step is, if practicable, to open out a small bottom heading or adit, for the double purpose of draining the ground above and making an opening through which to carry away the material subsequently excavated; this heading also is required for passing in the materials used in arching. Often, however, owing to long and heavy cuttings necessary in the outside approaches to a tunnel, it is deemed advisable to begin with a top heading before the bottom bench of the open cut is brought up to the face of the proposed work. If a bottom heading has been driven (and it is generally best to do so when practicable in soft ground, while the opposite rule holds in tunnelling through hard rock), one of the methods of subsequent enlarging that may be used is shown in figs. 3, 4, and 5. These represent the English plan, so called, it being the one generally adopted in England. For a full description of this method of enlarging, see the "Engineering and Mining Journal," vol. xix., p. 392; also Simms's "Treatise on the Blechingly and Saltwood Tunnels." Fig. 3 shows the bottom heading driven, with a section excavated and ready for arching. The enlarging and arching of a tunnel to its full size is generally done in lengths or sections. If there is no top heading previously driven, 15 or 20 ft. of an advanced heading is excavated at the top of the proposed work (shown in figs. 3 and 4). Heavy longitudinal bars of timber are then successively put in, beginning with those numbered 3, 6, and 7. The miners gradually work down, putting in a temporary arch of timber. When this is done, and foundations have been dug for the succeeding masonry, the masons take the place of the miners, and run up an arch under the timber, which is then withdrawn during the excavation of the next section, and the spaces left are securely blocked up with pieces of timber or stone. In some methods of tunnelling, it is deemed more secure to brick the timber in and leave it in place, though at a considerable cost, especially when it is necessary to bring all the heavy timber down a shaft or slope, and through a long distance underground. Shafts are often sunk, and sometimes slopes, so that the work may be attacked from several points at once. Fig. 5 shows the arch built, and is divided into two portions: that on the left shows the completed tunnel, with the ballast in place and the track laid; that on the right shows the arch in place, and the supporting timbers struck, but still undrawn. Where the ground is very treacherous, and much water is encountered, an inverted arch is often put in across the bottom of the tunnel, to withstand the pressure from below. Other methods are in vogue on the continent of Europe. A description of a new system of tunnelling by the use of iron centres, in place of timber, devised by himself, may be found in Ržiha's work, cited below. — *Tunnelling through Rock.* One of the methods of tunnel-

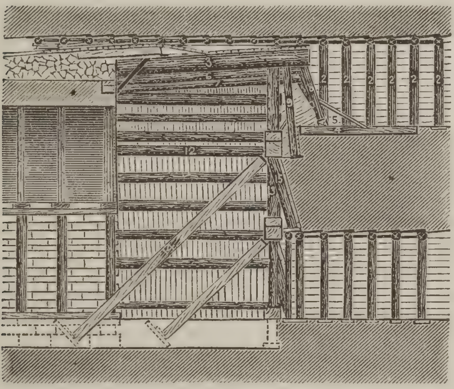


FIG. 3.

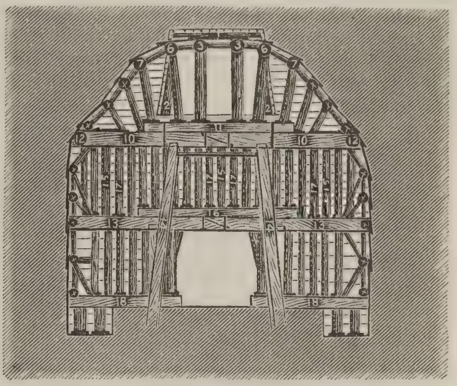


FIG. 4.

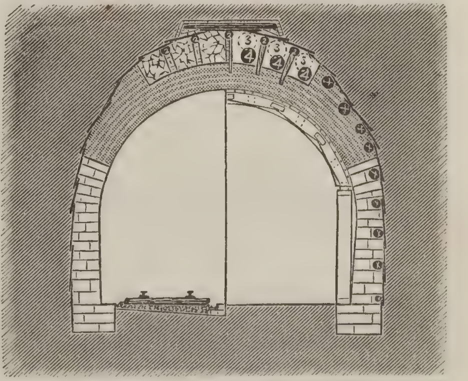


FIG. 5.

ling through loose rock, with subsequent timbering and arching, is shown in figs. 6 and 7; it is the one most used in America, and is expeditious, though probably more expensive than the European systems. The timbers 1 and 2 are put in to support the roof and sides when the top heading (which is generally preferred through rock) is driven; the "legs" (2) are occasionally braced by a bar (3), which is supported by a raker (4), while the sides are being dressed down when the tunnel is enlarged and arched. The space between the timber and the rock above, and between the masonry and the timber (which latter in this work should be left in place), is packed tight with fragments of stone, to prevent a sudden fall or stress being brought to bear on the masonry.—Tunnelling through solid rock by hand labor is still, in many cases, held to be more economical than by machinery. It is certainly so, as yet, in the case of small tunnels through a comparatively soft rock, where the necessary cost of a plant of air drills and compressors would be in excess of the economy in time gained by their use. In driving a tunnel through rock, an advanced heading is first driven either at bottom or top; and this may either be of the full width of the proposed excavation, or narrower. The heading is always the most difficult and expensive part of the work; for whether it be driven at top or bottom, the miner, in removing the remaining portion of rock, of course has much less resistance to contend against in blasting. Removing the top rock or the lower "bench" is more like open-air quarrying. Longer holes can be drilled, and heavier charges of powder used. At the present day, however, most heavy tunnel work is carried on with the aid of machine drills, driven by compressed air, which, on being liberated after acting as a motor, serves to ventilate the work. Since the introduction of machinery, the rate of driving attained in tunnelling has been greatly increased. Machine drilling was born of the necessity for some more rapid method of executing certain works, deemed almost too heavy to be accomplished by ordinary means. These were, in Europe, the Mont Cenis tunnel (see Cenis, Mont), and in America, the Hoosac tunnel in Massachusetts. Various types of drills have been invented and tried abroad; among them the Sommeiller, Dubois-François, Sachs, Osterkamp, Brydon Davidson and Warrington, Azolino dell' Acqua, Ferroux, McKean, and others. Among compressors that of M. Colladon of Geneva may be particularly noted. At Mont Cenis the air pumps were worked by hydraulic power. The perforators used there were built partly from designs already presented, but improved with original modifications made by the engineers in charge, Messrs. Sommeiller, Grandis, and Grattoni. A description of the Sommeiller machines may be found in the *Portefeuille économique des machines* (1863). The Mont Cenis tunnel was begun by hand labor in 1857, and finished in 1871, at a total cost of about $15,000,000. The following table, from M. Opperman's *Nouvelles annales de la construction* (1869), shows the rate of advance in that work by hand, and the increased rate attained immediately after the first introduction of machinery down to 1865, working throughout with two headings:

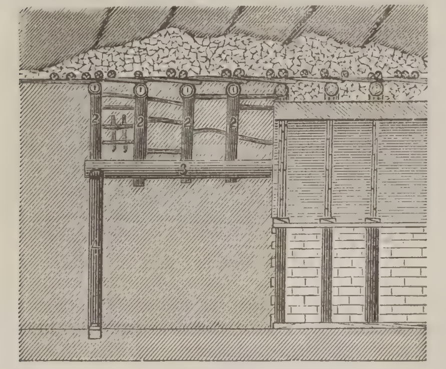


Fig. 6.

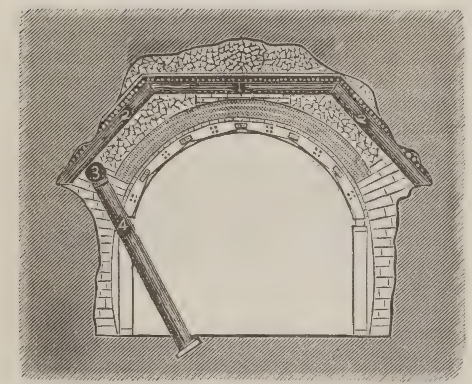


Fig. 7.

YEARS.	By hand, metres.	By hand and machinery, metres.	By machinery alone, metres.
1857	38	....	.....
1858	459	....	.....
1859	369	....	.....
1860	343	....	.....
1861	....	363	.....
1862	....	623	.....
1863	....	....	802
1864	....	....	1,807
1865	....	....	1,223

The St. Gothard tunnel, also through the Alps, is now (1876) in progress. From a late paper on the subject by Daniel K. Clark, M. Inst. C. E., London, we obtain the following general facts concerning it. The length of the tunnel is to be 16,295 yards or 9¼ m. The contract prices sum up to a total estimated cost of £1,896,945. Construction was begun in the autumn of 1872, and the total progress attained (two headings) up to Aug. 31, 1875, was as follows:

YEARS.	By band, yards.	By machines, yards.	Total, yards.
1872	132	....	.....
1873	205	972	.....
1874	....	1,951	.....
1875	....	1,824	5,084

The heading is driven at the top, about 8 ft. square, dynamite being used as an explosive. Dubois-François perforators were first used, making an average advance of 6·63 lineal feet a day. They were succeeded by Ferroux's, the daily advance being raised to 10·11 ft. Subsequently the machines of two or three inventors, Dubois-François, McKean, and Ferroux, were placed and worked together on the same carriage; and it is said by M. Louis Sautter, in an official report published in the *Revue industrielle*, Aug. 18, 1875, that the improved McKean drill has proved to be decidedly superior to any of its competitors; its best work on competition, with 6½ atmospheres of pressure, was a penetration of 12 in. a minute. While actually at work, its rate will vary from 3 to 8 in. a minute, with about 800 strokes. The power is derived from water through the agency of turbines. The cylinders or air pumps of the compressors are 18·1 in. in diameter, and the stroke is limited to 17¾ in., in order that the mean speed of piston may not exceed 266 ft., or 90 revolutions a minute, the turbine making 390 turns. The compressed air is cooled on Dr. Colladon's system; every piece that is in contact with the air when undergoing compression being cooled by currents of cold water, passed through air-tight envelopes. It is calculated that at the present rates of advance the St. Gothard tunnel may be finished during the summer of 1879, or within seven years from the date of M. Favre's contract.—In America, both North and South, many tunnels have been built, the modern ones being mostly driven since the introduction of railroads. Until the building of the Hoosac tunnel in Massachusetts, all tunnelling through rock in the United States was done by hand labor, by the methods above described. The project of tunnelling the Hoosac mountain was broached as early as 1825. In that year a board of commissioners, with Loammi Baldwin as engineer, was appointed to ascertain the practicability of making a canal from Boston to the Hudson, in the vicinity of the junction of the Erie canal with that river. Their report ("Massachusetts Commissioners' Report," 1826, p. 141) declares that "there was no hesitation in deciding in favor of the Deerfield and Hoosac river route," and that "there is no hesitation therefore in deciding in favor of a tunnel; but even if its expense should exceed the other mode of passing the mountain, a tunnel is preferable." Railways being shortly after introduced, the canal project was dropped. In 1828 surveys were made for three routes to afford Massachusetts railway connection with the west, viz., by Greenfield, by Northampton, and by Springfield. The last or southern route was chosen. The work was not begun immediately, but Massachusetts never lost sight of the advantage of a direct route to the Hudson river. This was finally accomplished in 1842, by the completion of the Western railroad to Albany. In 1848 application was made for a charter for a railroad from the terminus of the Vermont and Massachusetts line, at or near Greenfield, through the valley of the Deerfield and Hoosac, to the state line, there to unite with a railroad leading to Troy. The location was filed in the clerk's office of Franklin and Berkshire counties in November, 1850. In 1854 an act was passed "to enable the Troy and Greenfield railroad company to construct the Hoosac tunnel," by which the state, on certain conditions, lent its credit to the amount of $2,000,000. The estimated cost of the proposed double-track tunnel was $1,948,557, and of the road and equipment $1,401,443; total, $3,350,000. Still the company were unable to raise the funds necessary, in addition to the state loan. In 1855 a contract was made with E. W. Serrel and co., under which some work was done; and another was made with them in 1856 for the construction of the road and tunnel for $3,500,000, they subscribing $440,000. This contract also fell through, as did one made with H. Haupt and co. in the same year, by which the railroad company agreed to pay $3,880,000 for the completion of the road and tunnel. In 1858 a contract was again made with H. Haupt and co., by which the contractors themselves agreed "to assume the labor of collecting subscriptions and of carrying on and completing the Troy and Greenfield railroad and the Hoosac tunnel." Under this contract H. Haupt and co. were to receive $2,000,000 in bonds of the state of Massachusetts, to be exclusively appropriated to work done on the tunnel; $900,000 in mortgage bonds of the company; and $1,100,000 in cash, through cash subscriptions and capital stock of the company. Under this contract the work was vigorously prosecuted up to July, 1861, when, a difference arising between the contractors and the state engineer, a certificate for the amount claimed by the former on a payment was refused, and the work was thereupon abandoned by them. In 1862 an act passed the Massachusetts legislature, providing "for the more speedy completion of the Troy and Greenfield railroad and Hoosac tunnel." Under this act a board of commissioners was appointed to examine into the matter on the part of the state. At the request of these commissioners, the Troy and Greenfield railroad company, acting under the authority of certain provisions of the act, surrendered to the commonwealth of Massachusetts, under the several mortgages held by said commonwealth, the road and property of the company; such surrender having been authorized by the board of directors, by a vote passed on Aug. 18, 1862. This action was ratified by a vote of the stockholders, and on Sept. 4, 1862, the commissioners took possession of the road and its property. The commission after a full examination made a thorough report (dated Feb. 28, 1863), embracing the three following most valuable sub-reports: 1, a report of Charles E. Storrow on European tunnels; 2, a report by Benjamin H. Latrobe on the Hoosac tunnel; 3, a report by James Laurie on the Hoosac tunnel and the Troy and Greenfield railroad. In conclusion the commissioners recommended that the work should be undertaken by the commonwealth. At this point the cost and estimates were as follows:

Amount advanced by the state up to the date of the commission	$1,431,447
Estimated cost by the commission of completing the tunnel (double track)	3,218,323
Estimated cost of putting the road from Greenfield to the mountain in running order	652,060
Estimated cost of construction of two miles of road from western portal of tunnel to North Adams	67,500
Estimated additional cost of depot buildings, &c.	75,000
Estimated cost of rolling stock	275,000
Total estimated final cost of road and tunnel	$5,719,330

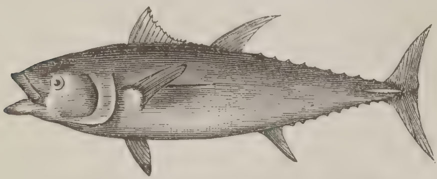
At this time, according to the report of James Laurie above noted, the condition of the work proper was as follows:

Whole length of the proposed tunnel, feet		24,416
Deduct portion already excavated at each end.	2,400	
Deduct portion between shaft and proposed western portal of tunnel	1,850—	4,250
Leaving to be excavated under the mountain		20,166

The shaft here referred to was on the western slope of the mountain, 325 ft. in depth. Mr. Laurie estimated that by sinking a central shaft about 1,000 ft. deep and working therefrom (which was afterward done) the tunnel, advancing at the rates respectively of 55 ft. a month from the two end portals, and 40 ft. each way from the shaft, would be completed in 11 years from date, *i. e.*, in 1874; this estimate being based on the supposition that the central shaft would reach bottom in four years from its commencement. Work was resumed on the tunnel under the auspices of the state in October, 1863, under the control of the same board of commissioners, who appointed Thomas Doane chief engineer in charge. The governor at the same time appointed Benjamin H. Latrobe of Baltimore state consulting engineer of Hoosac tunnel.—Mr. Laurie in his report to the commissioners says that shortly after the Troy and Greenfield railroad was chartered, the attention of inventors was turned to the subject of tunnelling machines. One was constructed at South Boston in 1851, especially for the Hoosac tunnel, which weighed about 70 tons, and was designed to cut out a groove around the circumference of the tunnel 13 in. wide and 24 ft. in diameter, by means of revolving cutters; the central core left was to be subsequently blasted out with gunpowder. It is reported to have cut, on a trial made March 16, 1853, on a vertical face of rock near the proposed entrance of the tunnel, at the rate of 16½ in. an hour, and under more favorable conditions at a previous trial 20 in. an hour. Various trials were made with this machine, the total distance cut by it amounting to about 10 ft., but it did not prove successful. A second machine constructed at Hartford, and known as the "Talbot tunnelling machine," also working on the principle of revolving cutters, and adapted to cut out a core 17 ft. in diameter, was tried about this time near Harlem, but proved a failure. A third machine was constructed in New York, adapted to cut a core of 8 ft.; this was adopted by Mr. Haupt during the continuance of his contract, in the early days of the tunnel, but also proved a failure. Experiments were instituted by Mr. Haupt himself, while engaged with his contract at Hoosac, toward the elaboration of a percussion drill; but in 1861 the termination of his contract for a time put an end to them. Afterward he again took up the subject, and in 1867 published a description of the Haupt drill. By the time this invention had been perfected, the Burleigh drills, which have since attained so great a reputation (see Blasting), had been adopted and were in full use at Hoosac. They were first tried in June, 1866, under the direction of the commissioners, and even in their crude and unimproved condition were favorably noticed in Chief Engineer Doane's report. In January, 1867, the office of chief engineer was abolished, and the engineer corps reduced to one resident engineer, W. P. Granger; Mr. Latrobe still supervising as consulting engineer. In October, 1867, owing to the accidental lighting of some naphtha at the central shaft, the head house, shaft buildings, &c., were consumed, and 13 lives were lost. Previous to this time portions of the work had been let out by contract, Messrs. Dull, Gowan, and White having the east and central shaft headings, through rock, and Mr. B. N. Farren the west end, through soft ground, including the arching of the same. Owing to the above mentioned accident, Messrs. Dull, Gowan, and White voluntarily surrendered their contract, received their pay, and abandoned the work, returning it to the hands of the commissioners. Benjamin D. Frost was appointed superintending engineer in May, 1868, and on Dec. 24 of that year a contract was effected between Messrs. Shanly brothers of Montreal and the commonwealth of Massachusetts for the final completion in full of Hoosac tunnel. The dimensions were to be: "in rock, unarched, 24 ft. wide and 20 ft. high, in the clear; where arching required, 26 ft. wide and 24½ ft. high (above the rail), in the clear." The prices bid in the contract varied in the different portions of the work, and also according to whether the work was "already begun," "to be finished," or for "extension of full-sized tunnel." The bids accepted for the latter item were as follows: east end section, per cubic yard, $11; central section from shaft, $14; west end section (part soft ground), $12; for arching part of the tunnel with brick, per thousand of bricks laid, $22. The total price agreed on for the work specified by the contract was $4,594,268, the whole to be done by March 1, 1874. At this time Mr. Latrobe resigned as consulting engineer; and that post, after the successive resignations of James Laurie and Edward S. Philbrick of Boston, is now (1876) held by Thomas Doane. The work was vigorously attacked by the Messrs. Shanly at all points. The Burleigh drills and compressors were used throughout their contract with excellent results. Under their patronage, the manufacture of nitro-glycerine (previously used in the tunnel) was carried on and improved by George M. Mowbray of North Adams. The east heading met the one driven east from the central shaft on Dec. 12, 1872; the west heading met the one driven west from the shaft on Nov. 27, 1873; the errors in alignment and levels were astonishingly small, especially as the former meeting was at a distance of 1,563 ft., the latter of 2,056 ft., from the shaft, down which the plumb lines had to be carried over 1,000 ft. The Messrs. Shanly concluded their contract and effected a final settlement Dec. 22, 1874. Independently of the contract taken by them, an agreement was entered into between the state and B. N. Farren, on Nov. 19, 1874, to do certain arching and enlarging at the eastern portal of the tunnel. By authority of an act passed by the legislature in 1874, a commission of experts, comprising Prof. T. Sterry Hunt of Boston and Prof. James Hall of Albany as geologists, and Thomas Doane, Josiah Brown, and Daniel L. Harris as civil engineers, was appointed to examine and report on the amount of arching that would be still necessary. Their reports are embodied in that of the commission of 1875, as is also a report from Edward S. Philbrick, consulting engineer, recommending an additional amount of 1,600 ft. of arching, besides that included in the Shanly contract. Work on this arching is still (March, 1876) in progress. Under a law of 1874 a board of corporators of the Boston, Hoosac Tunnel, and Western railroad was created, who reported that the tunnel had up to that time cost the state about $14,000,000. By a subsequent act of 1874 the corporators were superseded by five directors, to whom the interest of the state in the tunnel and railroad was transferred.—The next tunnel in the United States in which machine drills were introduced with effect, after their practicability had been demonstrated at Hoosac, was the Nesquehoning tunnel in Pennsylvania, constructed under the direction of J. Dutton Steele as chief engineer. (See paper by J. Dutton Steele in "Transactions of the American Society of Civil Engineers," 1871.) Here the Burleigh drill and ordinary black powder were used. The Musconetcong tunnel, on the Lehigh Valley railroad extension through New Jersey, was the next heavy piece of work in the eastern states on which machine drilling was adopted. This tunnel was begun in April, 1872, and finished in June, 1875, under the charge of Robert H. Sayre, chief engineer and general superintendent of the Lehigh Valley railroad company. Charles McFadden of Philadelphia took the contract, and completed what has been conceded to be one of the heaviest pieces of tunnel work ever attempted in America, and yet one of the most rapidly built. Every modern appliance was used. The Ingersoll drill was adopted, about 26 being kept on hand, and from 16 to 18 in constant use. Four Burleigh compressors supplied the air required at the west end, and four Rand and Waring compressors at the east. Dynamite was used throughout as an explosive, and gave entire satisfaction. Very heavy difficulties were encountered in the prosecution of the work, owing to the large bodies of water met with. The total length of the tunnel was a little less than one mile. It was begun by sinking a slope to grade on the western side of the mountain, about one third of the distance through, virtually dividing the tunnel into one third of soft ground working at the west, and two thirds of very hard ground at the east. The headings were started east and west from the bottom of this slope in November, 1872. The east heading had been started in July, 1872. Owing to the heavy cutting necessary at the west end, the heading could not be connected with those from the slope, and from a shaft subsequently sunk, until November, 1873. In May, 1873, so heavy a body of water was struck in the slope heading going east, that it could not be controlled. The miners were driven out, and the slope half filled. The water undermining the props and backing of the timbering in the slope, part of the roof fell in, and the work at that point had to be abandoned temporarily. A shaft was then sunk west of the slope, and headings were driven east and west to tap and draw off this water. Here again new and even heavier bodies of water were encountered, resulting in great expense and much loss of time. Finally the difficulties were overcome, the water tapped, and work resumed on the original slope heading going east, which met the east heading coming west in December, 1874, the errors in alignment and level being less than half an inch. (For further details on the construction of this tunnel see a paper by Henry S. Drinker in the "Transactions of the American Institute of Mining Engineers," vol. iii.) With the admirable and delicate instruments now so readily obtainable, it would require a positive effort of carelessness on the part of the engineer to entail any serious error in tunnel surveys. Especially noticeable among instruments are those recently perfected by Messrs. Heller and Bright-ly of Philadelphia, who have made a specialty of tunnel transits.—The above described three tunnels have been taken as particular examples, because they are the latest driven at the present time (March, 1876), and are the best examples of the present stage of the art of tunnelling in the United States. A large tunnel in Nevada, known as the Sutro tunnel, has been in process of construction with machinery for some years. (See NEVADA.) It is intended to serve as an adit to the Comstock lode. (See "Report of United States Sutro Tunnel Commission," Washington, Jan. 6, 1872.)—One of the first tunnels in the United States was on the Alleghany Portage railroad in Pennsylvania. It was built in 1831, double track, 900 ft. long; contract price, $1 47 per cubic yard; total cost, 14,857 cubic yards, $21,840. Another early work was the Black Rock tunnel, on the Reading railroad, built in 1836. This was 1,932 ft. long, and the excavation proper of the tunnel cost $125,935. According to data furnished by Mr. B. H. Latrobe of Baltimore, there are 44 tunnels on the line of the Baltimore and Ohio railroad and its branches, with an aggregate length of 37,861 ft., or 7 m. 901 ft., the tunnels varying from 80 to 4,100 ft. in length. The Sand Patch tunnel, on the Pittsburgh and Connellsville branch, was begun in 1854 and finished in 1871. The work during this time was intermitted for a total period of nine years, owing chiefly to the financial embarrassments of 1858. It was driven through the old red sandstone, and cost nearly $500,000. The Kingwood tunnel, 4,100 ft. long, was begun in September, 1849, and finished in May, 1852, at a total cost, including excavation and arching, of $724,000. The Broadtree tunnel, 2,350 ft. long, on the same road, begun in the spring of 1851, was completed in April, 1853, at a total cost (excavation and arching) of $503,000. The Chesapeake and Ohio railroad is 423 m. long, and has 7 m. of tunnelling; the Big Bend tunnel, on the Greenbrier division, is 6,400 ft. long. —Of the rates of progress attainable by machine drilling, a fair average can be deduced from three large tunnels driven through different kinds of rock. At the Hoosac tunnel, through mica schist and micaceous gneiss, with nitro-glycerine, the progress attained by Shanly brothers at the east end in 1869 averaged 139½ ft. a month, and in 1870, 126½ ft.; at the west end in 1870, 100¼ ft. In sinking the central shaft 1,080 ft. in depth, through rock, the average total progress per working month was 21 ft., but the 230 ft. sunk by Shanly brothers was driven in 7½ working months, or at the rate of 30·7 ft. a month. At Nesquehoning, through conglomerate, the average attained in 12 months' driving was 100 ft. a month; while through red shale an experience of two months gave an average of 160 ft. a month. Common black powder was used, the consumption in the conglomerate being about 6 lbs., and in red shale 3½ lbs. per cubic yard of rock broken. At the Musconetcong tunnel the average monthly advance through a very hard syenitic gneiss, pronounced harder by experts familiar with both than any body of rock met in the Hoosac tunnel, was in 1874: east heading, average of 12 months, 115·8 ft.; west heading, average of last 6½ months, when steady work was attained, 136·8 ft. At this tunnel a shaft was also driven 110 ft. in depth through soft ground, with timbering, at an average rate of 24¼ ft. a month. The prices bid at the present day for tunnel excavation vary from $4 to $7 and $8 per cubic yard. But the contract prices are not always a sure criterion as to the final cost; $6 per cubic yard is a medium bid. Very heavy and expensive tunnel work is often done in constructing underground railways through cities. In these the plan generally adopted is first to make an open-air excavation through the streets, then build the arches and fill in the ground again. A very heavy tunnel was lately finished under the London docks, passing also under some large warehouses, and needing very careful work. The quantity of water pumped was enormous. The final cost was at the rate of £390,000 a mile.—*Subaqueous Tunnels.* Among these should be particularly noted the first one built under the Thames at London. Except however in view of its vast expense, and the fact that it was the forerunner of modern subaqueous tunnelling, its record at the present day, since the system has been further developed, has no very practical interest. It was begun in 1807, intermitted, and resumed in 1825, under Sir M. I. Brunel, intermitted again, and at last completed and opened for foot passengers in 1843. Its total length is 1,200 ft.; final cost nearly £1,200 per lineal yard advanced. (See LONDON, vol. x., pp. 616–617.)—A tunnel that has attracted much attention throughout both Europe and this country is the one at Chicago, driven out under Lake Michigan, for the purpose of obtaining pure water for the city. This tunnel, begun in March, 1864, and completed in March, 1867, was entirely original in plan; the engineer was Mr. E. S. Chesbrough. A crib was first sunk in Lake Michigan, about two miles from the shore, 58 ft. in horizontal outside measurement on each of the five sides, and 40 ft. high. The inner portion or well has sides parallel with the outer ones, 22 ft. long each, leaving the distance between the inner and outer faces of the crib, or thickness of the breakwater, 25 ft. This breakwater was built on a flooring of 12-inch white pine timber, laid close together. The outer and inner vertical faces, and the middle wall between them, were all of solid 12-inch white pine timber, except the upper 10 ft. of the outside, which was of white oak, to withstand better the action of the ice. The outer and inner walls were strengthened and connected with brace walls and cross ties of 12-inch timbers, all securely bolted. The crib was built on land, launched, towed into place, filled with stone, and sunk. An iron cylinder, cast in 9-foot sections, of 9 ft. internal diameter and 2¼ in. thick, was then lowered within the crib to the bottom of the lake; and this cylinder was connected with the land two miles distant by a tunnel under the lake bottom. Gate wells were constructed in the sides of the crib, and after the completion of the tunnel the top section of the cylinder, extending above water level, was removed, and the water admitted through a screen. The tunnel, of circular cross section, was driven through a stiff blue clay; diameter of excavation 5 ft., subsequently lined with two rings of brick. The final cost in full to the city was $457,844. According to the statements and books of the contractors, the items were: crib and outer shaft, $117,500; land shaft, $12,000; tunnel proper, $195,000; total, $324,000. The balance of the expenditure was used in necessary contingencies. For full details of this work see "Eighth Annual Report of the Board of Public Works" (Chicago, 1869); also a report of Prof. W. P. Blake, commissioner of California to the Paris exposition (1867). A second tunnel, 7 ft. in diameter, extending to the same crib, was completed in July, 1874, at a total cost of $411,510; and two tunnels for traffic have been constructed under Chicago river. A tunnel under Lake Erie, at Cleveland, Ohio, begun in August, 1869, finished in March, 1874, is similar in plan, purpose, and construction to the one first driven under the lake at Chicago, except that much greater difficulties were encountered in its construction, from meeting several bodies of very soft ground. It is 6,606 ft. in length, and the total cost amounted to $320,352.—It was estimated by Capt. Tyler in 1873 that between 300,000 and 400,000 persons yearly crossed the English channel at Dover, that the number was constantly increasing, and that if a tunnel were built it would probably be doubled. The idea of a tunnel under the channel was first broached by M. Mathieu, a French engineer, who laid plans for one before Bonaparte in 1802. Owing to the subsequent disturbances the projector and his plans were lost sight of. Subsequently plans were proposed by M. Thomé de Gamond, Dr. Payerne, Messrs. Franchot and Tessier, Favre, Mayer, Dunn, Austin, Sankey, Boutet, Hawkins Simpson, Low, Boydon, Brunlees, Waenmaker, and others. To M. Thomé de Gamond is conceded the credit of pushing the project to its present advancement. In 1872 the present channel company was incorporated, Sir John Hawkshaw, Mr. James Brunlees, and M. Thomé de Gamond being appointed the engineers. The route finally adopted places the tunnel on a line drawn from St. Margaret's bay near the South Foreland, on the English side, to a point between Sangatte and Calais in France. The total proposed length of the tunnel is 31 m., of which 22 m. will be under the channel. Should the preliminary tests prove favorable, it is proposed to begin the actual construction by sinking shafts on either shore to the depth of 450 ft. below high-water mark. Driftways will be driven from the bottom of these for the drainage of the subsequent tunnel proper. The tunnel, if constructed, is to begin 200 ft. above the driftway, and will be driven from both ends. It is to be through the chalk, and in no part of it will there be less than 200 ft. of ground between the crown of the arch and the bed of the channel. It will be on a down grade of one foot in 80 to the junction of the drainage driftway, and then on an up grade of one in 2,640 to the middle of the strait. It is proposed to drive the driftway or heading with Dickinson Brunton's machine for tunnelling through chalk, which works like an auger boring wood. It is believed, from actual work done, that this machine will advance at the rate of from a yard to a yard and a quarter an hour. At this rate it would require two years to construct the driftway, driving from either end, at an estimated cost of £800,000. After the heading has been driven through, it has been estimated that four years' time and an outlay of £4,000,000 will finish the work, including arching; but Sir John Hawkshaw and his associates consider it best, before beginning the work, to double this figure as an estimate. The preliminary works to be undertaken are the sinking of two shafts at either extremity of the tunnel, from which an ordinary mining driftway is to be driven about half a mile out under the sea, the cost of which is estimated at £160,000. This done, the engineers will be better able to judge of the ultimate practicability of the work.—See *Lehrbuch der gesammten Tunnelbaukunst*, by F. Ržiha (6 vols., Berlin, 1865–'72); and *Der Tunnelbau*, by J. G. Schön (4to, Vienna, 1866). There is no complete work in English on modern tunnelling. The facts in this article are largely drawn from a practical treatise on American and European tunnelling, now (1876) in course of preparation by Henry S. Drinker, E. M., of Philadelphia.

TUNNY, a marine fish of the mackerel family, and genus *thynnus* (Cuv.). The body is elongated and compressed, with a slender tail keeled in the middle, and with two oblique cutaneous folds at the base of the caudal fin on each side; mouth large, with the teeth small, awl-shaped, in a single row on each jaw, and fine and crowded on the vomer and palate; there are two dorsals, near together, the posterior followed by nine or ten finlets opposite those of the anal fin; scales largest around the pectoral region, forming a kind of corslet, on the anterior part of the back, and along the lateral line; cerebellum remarkably large. The common tunny of Europe (*T. vulgaris*, Cuv.) attains a length of 15 to 20 ft., and a weight of more than 1,000 lbs.; it is dark blue above, the corslet lighter, sides of head white, and below grayish white spotted with silvery; first dorsal, pectorals, and ventrals black, the other fins mostly flesh-colored; the pectorals are scythe-shaped, and one fifth the length of the body.

It is very active and voracious, feeding on herring and the small migratory species. Tunnies are very abundant at the E. and W. ends of the Mediterranean, and in its narrowest portions generally, approaching the shores in summer in large shoals for the purpose of spawning; at this time they are captured in large nets arranged in a funnel-like form. The flesh is highly esteemed, almost like meat, as firm as that of the sturgeon, but finer flavored. It is found also in the Atlantic and in the North sea. The principal fishery of the present time is carried on in Sicily and Sardinia.—The American tunny (*T. secundo-dorsalis*, Storer), called also horse mackerel and albicore, attains a length of 9 to 12 ft.; it is nearly black above, silvery on the sides, and white below; gill covers and pectorals silvery gray; iris golden; ventrals black above and white below; finlets mostly yellow; the second dorsal is much higher than the first, anal further back than in the European tunny, and the pectorals are shorter. It is found from New York to Nova Scotia, coming into Massachusetts bay about the middle of June and remaining through September; it gets very fat by the end of August, and is then valuable for the oil, which is obtained by boiling the head and the abdomen; a single fish yields about 20 gallons; it is taken by the harpoon, and is active, strong, and tenacious of life; it feeds on menhaden and other small shoal fish; its flesh, which is rarely used here except for mackerel bait, resembles lean pork, with a fine mackerel taste.—The tunny of the tropics (*T. pelamys*, Cuv.), with other allied genera of the family, has been described under Bonito.



American Tunny (Thynnus secundo-dorsalis).

TUNSTALL, or **Tonstall, Cuthbert,** an English prelate, born at Hatchford, Yorkshire, in 1474 or 1475, died at Lambeth palace, Nov. 18, 1559. He was educated at Oxford and Cambridge, became a fellow of the latter university, and then studied at Padua. He became rector of Harrow-on-the-Hill in 1511, and in 1515 archdeacon of Chester. In 1516 he was appointed master of the rolls, and sent as commissioner to Brussels, where he concluded two treaties with Charles I. of Spain (afterward Charles V.), and became acquainted with Erasmus. In 1521 he was made dean of Salisbury, in 1522 bishop of London, and in 1523 lord privy seal; and he was twice ambassador to Spain and France. In 1530 he was translated to the bishopric of Durham. He soon after resigned the privy seal, but he remained bishop through all the changes made by Henry VIII. and Edward VI., and also had a place in the councils of state, till October, 1552, when he was deprived of his bishopric and committed to the tower. Mary reinstated him, but declining the oath of supremacy on Elizabeth's accession, he was again deprived in July, 1559, and remained the guest of Parker, archbishop of Canterbury, till his death. His works include *In Laudem Matrimonii* (4to, London, 1518); *De Arte Supputandi Libri IV.* (4to, 1522), a treatise on arithmetic, often reprinted; "Compendium and Synopsis," an abridgment of Aristotle's "Ethics" (8vo, Paris, 1554); "A Defence of Predestination" (4to, Antwerp, 1555); and a volume of prayers (8vo, 1558).

TUOLUMNE, an E. county of California, bounded N. by the Stanislaus river and E. by the Sierra Nevada mountains, and drained by the Tuolumne river; area, 1,944 sq. m.; pop. in 1870, 8,150, of whom 1,524 were Chinese. The surface is level in the W. part, and in the E. mountainous and covered with excellent timber, which is largely exported; the soil of the valleys is very fertile. It was formerly one of the most important mining counties of the state, and mining is still carried on to a considerable extent. The chief productions in 1870 were 21,920 bushels of wheat, 7,995 of barley, 5,260 of potatoes, 48,525 lbs. of wool, 26,760 of butter, 51,590 gallons of wine, and 5,132 tons of hay. There were 1,283 horses, 1,681 milch cows, 2,849 other cattle, 30,117 sheep, and 4,266 swine; 5 breweries, 5 saw mills, and 8 quartz mills. Capital, Sonora.

TUOMEY, Michael, an American geologist, born in Cork, Ireland, Sept. 29, 1805, died in Tuscaloosa, Ala., March 20, 1857. He early emigrated to the United States, and in 1835 graduated at the Rensselaer polytechnic institute, Troy, N. Y. In 1844 he was appointed state geologist of South Carolina, in 1847 professor of geology, mineralogy, and agricultural chemistry in the university of Alabama, and in 1848 state geologist. He published a "Report on the Geology of South Carolina" (4to, Columbia, 1848); "First Biennial Report on the Geology of Alabama" (8vo, Tuscaloosa, 1850); and, with Prof. F. S. Holmes, "Fossils of South Carolina" (4to, parts i.–x., Charleston, 1855–'7).

TUPELO, a name given by some tribes of Indians to species of *nyssa*, especially *N. multiflora;* this is also called sour gum and black gum, and is described, together with the characters of the genus, under the latter title. There is much confusion among the species, as they are very variable; there are at least four in the United States and one or two in the Himalaya mountains and other eastern localities. The one above referred to is the most common. The large or one-flowered tupelo (*N. uniflora*) is found from Virginia and Kentucky southward, often growing in the water; the bark is very corky, and the wood so light that sections of the branches and roots are used as floats for seines; its large leaves, 4 to 12 in. long, are often heart-shaped at base;

the fertile flowers are solitary; the blue fruit an inch or more long. A more southern species is the water tupelo (*N. aquatica*), which grows in the pine-barren swamps of North Carolina, and extends southward and westward; it occurs both as a mere shrub and as a large tree, with smaller leaves and fruit than those of the common *N. multiflora*, or black gum. A fourth species is known as the Ogeechee lime (*N. capitata*), a small tree found near the coast in Georgia and Florida; its sterile flowers are capitate, or in a head, and the solitary fertile ones are succeeded by a red fruit, an inch or more long, quite acid, but eatable, and in request for making preserves.

TUPÍ-GUARANÍS, a widely extended family of Indians in South America, embracing the Guaranís proper in Paraguay, among whom the Jesuits established their famous missions described by Muratori and Charlevoix; the eastern Guaranís or Tupís in Brazil, consisting of a vast number of tribes chiefly on the coast; the northern Guaranís, near the Orinoco; the central Guaranís or Chiriguanes, in the northern part of the Gran Chaco; and the Omaguas or western Guaranís, in the district of Quito. These last were numerous, warlike, and powerful, and were regarded by other tribes as a peculiarly noble race. They refused to receive missionaries, and at one time carried on a fierce war against the viceroy of Peru. The Tupís and Guaranís proper were mild and unwarlike, falling a prey to the cannibal Aymborés and to the Portuguese, who invaded their towns to reduce them to slavery. The Guaranís had not the conception of a Great Spirit common to the tribes in the northern part of the continent. They were never civilized except by the Jesuit system of reductions, in which they were kept in a kind of tutelage, or by their enrolment in the Brazilian army. In some respects they differed from other American tribes and resembled natives of the Pacific islands. The Mandrucús, a Guaraní tribe who fled northward from the Portuguese, build houses like the Dyaks, and like them dry and preserve the heads of their enemies; the blowpipe of the Amazon and of Borneo are the same; the Purupurús of the Amazon have the throwing stick of the Australians; while bamboo baskets and boxes from the Amazon can scarcely be distinguished from those of Borneo and Papua. During the flourishing period of the Paraguay missions in 1732, the Christian Guaranís numbered 144,000, but in 1742 they had lost 50,000 by European diseases. The Portuguese in 1750 claimed and obtained seven missions, which were at once abandoned by the Indians. The suppression of the Jesuits was a deathblow to the missions, and the Indians soon dwindled away. The Portuguese had from the first enslaved them, exterminating whole villages and compelling others to emigrate. The most remarkable exodus was that of the Tupinambas and Tamoyas, who under Jappy Assu emigrated from their southern homes and settled 3,000 m. off on the Amazon, where they are known as the Mandrucús. In all Brazil there are only 19,000 Indians reported at the present time. The Chiriguanes and Omaguas hold their own better, but have gradually disappeared from Colombia, Venezuela, and Ecuador.—The original seat of the Guaranís is in doubt; some think, from the higher character of the Omaguas and Chiriguanes, that they were the original stock, but their language is evidently but a dialect, less perfect in its structure and vocabulary than that of the Guaranís on the southeast. The beauty of this language is extolled by many investigators of American linguistics. The standard grammar and vocabulary of the Guaraní are the *Tesoro de la lengua Guaraní*, by Padre Antonio Ruiz de Montoya (Madrid, 1639), and *Arte y vocabulario*, by the same (1640). The *lingoa geral* of Brazil is based on the Tupí, a Guaraní dialect. As to it see *Diccionario da lingoa Tupy, chamada lingoa geral*, by Dias (Leipsic, 1858), and *Chrestomathia Linguæ Brazilicæ*, by Dr. Franco (Leipsic, 1859).

TUPPER, Martin Farquhar, an English author, born in London, July 17, 1810. He graduated at Oxford in 1832, and in 1835 was admitted to the bar, but has never practised. His "Proverbial Philosophy, a Book of Thoughts and Arguments originally treated" (1838; 2d series, 1842; 3d series, 1867), brought him into immediate popularity, and, in spite of much contemptuous criticism, has passed through numerous editions, and been translated into several languages. In 1845 he was elected a fellow of the royal society, and he has received the Prussian gold medal for science and art. His numerous succeeding works include "A Modern Pyramid to commemorate a Septuagint of Worthies" (1839), a series of sonnets and essays on 70 celebrated men and women; "An Author's Mind" (1841), containing plans of 30 unpublished works; "The Crock of Gold," "Heart, a Social Novel," and "Twins, a Domestic Novel" (1844); "Probabilities, an Aid to Faith" (1847); "Hactenus, a Budget of Lyrics" (1848); "Surrey, a Rapid Review of its Principal Persons and Places" (1849); "King Alfred's Poems in English Metre" (1850); "Farley Heath" (1851); "Hymns for all Nations, in Thirty Languages" (1851); "Ballads for the Times" (1851); "Heart, a Tale" (1853); "Probabilities" (1854); "Lyrics" (1855); "Stephen Langton" (1858); "Three Hundred Sonnets" (1860); "Rides and Reveries of Mr. Æsop Smith" (1861); "Cithara, a Volume of Lyrics" (1863); "Alfred," a play (1865); "Raleigh," a play (1866); "Our Canadian Dominion; Half a Dozen Ballads about a King for Canada," and "Twenty-one Protestant Ballads" (1868). In 1875 he wrote a play founded upon incidents of the American revolution, and introducing Washington and contemporary characters. In 1851 Mr. Tupper visited the United States. His life has been spent principally in retirement at his maternal estate, in the parish of Albury, near Guildford, Surrey.

TURANIAN RACE AND LANGUAGES. The constituent members of this race (whose ethnological appellation has been chosen in reference to the Turan of the Persians, the land of the northern nomads, in contradistinction to Iran) are as follows: 1. The Finno-Hungarian, Uralo-Finnic, or Ugrian branch. Its subdivisions are: *a*, the Ugric, including the Hungarian or Magyar as principal member, with the Vogul and Ugro-Ostiak in and beyond the Ural; *b*, the Bulgaric, including the Tcheremisses and Mordvins, scattered tribes along the Volga; *c*, the Permian group, of the Permian, Sirian, and Votiak, in eastern Russia; *d*, the Finnic or Tchudic, including the Lapp, the Finnish proper, or Suomian, and the Esthonian. The Bashkirs are also now considered as belonging to this branch. This is the most western branch of the family, lying chiefly within the limits of Europe; it is also the one of highest endowment, most perfect language, and most advanced culture. 2. The Samoyedic branch, comparatively insignificant in numbers, position, and history, and one of the lowest races of the Asiatic continent. The Samoyeds occupy principally the country between the Obi and the Yenisei, the inhospitable shores of the Arctic ocean from the White sea to beyond the North cape of Asia, and in small groups the northern mountains of central Asia. 3. The Turkish or Tartar (more properly Tatar) branch, the most widely spread of all, reaching from Turkey in Europe to beyond the middle of central Asia, with important outliers in the yet more remote northeast, as the Yakuts of the Lena. Its subdivisions are very numerous, but are grouped in three chief classes: those of the southeast, in and to the east of Turkistan; those of the north, including among others the Kirghiz and Yakuts; and those of the west, stretching from northern Persia through Asia Minor and the Crimea to Constantinople, and scattered in patches over the European dominions of the sultan. 4. The Mongolian branch, composed of three families, East Mongols, West Mongols, and Buriats, inhabiting the present territory of Mongolia, the slopes of the Altai mountains, and in groups the lands bordering on Persia, India, and China. 5. The Tungusian branch, of which the principal race is the Mantchoo, which has held China in subjection during the past two centuries. There is no question respecting the family relationship of these branches. The common name Turanian is more frequent than any other, but various scholars prefer the terms Mongolian (in the wider sense), Uralo-Altaic, Scythian, or Tartaric; the first of these four seems to be gaining universal favor. It has been sought to extend still further the boundaries of this immense family, by attaching to it the Dravidian races of southern India and other Asiatic peoples, and even tying on the Malays and Polynesians, and the North American tribes; but such sweepingly synthetic classification is, in the present stage of linguistic ethnology, to be regarded as utterly unscientific. Even the combination of the branches above mentioned into one family is not beyond question; the Mongol and Mantchoo branches may yet be found unconnected with the others.—As the Aryan or Indo-European languages are much more varied and diverse in their development than the Semitic, so they are, in their turn, vastly exceeded in this respect by the idioms now under consideration. The law of linguistic connection prevailing among the latter is quite peculiar; between tribes confessedly of near kin exist differences of linguistic material even in cardinal points, such as the pronouns, numerals, and important affixes of derivation. A marked similarity of linguistic method, however, runs through them all, and helps to stamp them as kindred. They are all formed on what is called the agglutinative type; that is to say, the root or theme everywhere maintains its form almost unchanged, and all formative syllables are suffixed, never prefixed, to it; and they enter with it into no intimate union giving rise to forms which are accepted by the mind, without analysis, as signs for the complex idea; they remain in the condition of loosely appended elements. There are no varieties and irregularities of nominal and verbal flexion; each language has but a single declension and (with unimportant exceptions) a single conjugation. The plural of declension is formed by a pluralizing particle, to which the same case endings are then attached as in the singular. Grammatical gender is unknown. The cases are numerous. Prepositions always follow the words they govern; as, indeed, it is a general rule that the governed word precedes the governing. Words connecting sentences, relatives and conjunctions, are in most languages hardly employed at all. A marked phonetic peculiarity running through all the dialects is the law of harmonic sequence of vowels; the vowels are divided into two classes, heavy and light (or hard and soft), and within the same word only heavy or only light vowels can follow one another; the vowel of a suffix, or those of a series of suffixes, changing to conform themselves to the character of that of the root. The languages are rich in harmonious and well developed vocabularies, so far as the sound goes, and they abound in nice distinctions of certain kinds. Yet their rank in the general scale of language is low; they are deficient in sharp distinction of the principal grammatical categories, and awkward, cumbrous, and incomplete in the expression of thought. This character belongs to them in varying degree; the Mantchoo dialects are the poorest of all, and the Mongol do not much surpass them; the Tartaric idioms hold the middle rank; the tongues of the Finnic branch, particularly the Finnish proper and the Hungarian, possess a marked superiority to the others. Most of the languages of the family are known only in their present condition. None of the branches has ever had a properly national literature, if we except the mythic and legendary songs of the Finns and the mostly lyric popular songs of the Hungarians; but even some of the remoter tribes, under the influence and by the aid of foreign teachers, have acquired the art of writing, and have brought forth religious and historical works, while the Hungarian and Turkish have developed important literatures. It is also believed that on the cuneiform monuments of Mesopotamia and Persia is represented, in the inscriptions of the third order, a Ugrian dialect, now frequently designated as Accadian, and that we have there authentic evidence and remains of an ancient Ugrian civilization, which preceded and formed the basis for that of the other races in the same regions. F. Lenormant has recently (1874) written a grammar of the Accadian on this assumption of its value. These results of a small number of investigators are not yet fully accepted by scholars in general.—See Rémusat, *Recherches sur les langues tartares* (Paris, 1820); Rask, in several of his philological works; Schott, in numerous memoirs published by the Berlin academy, especially *Ueber das altaische oder finnisch-tartarische Sprachengeschlecht* (1849); Castrén, in a series of grammars, essays, accounts of travel, &c. (St. Petersburg, 1853–'8); Max Müller, "Letter on the Turanian Languages," in Bunsen's "Philosophy of Universal History," vol. i., and "Lectures on the Science of Language" (London, 1861); and Pauly, *Description ethnographique des peuples de la Russie* (St. Petersburg, 1862).

TURBINE (Lat. *turbo*, a whirling, or that which whirls), a water wheel through which the water passes, guided by channels in the wheel itself, and usually by other passages exterior to the wheel which cause it to impinge on the wheel buckets at the proper angle to secure efficiency. The guide curves (as the walls of the last named channels are called) and the buckets of the wheels are usually both curved in such manner that the water shall enter the wheel as nearly as possible without shock, and shall leave it with the least possible velocity. Turbines are generally, but not always, set in the horizontal plane, their axes being vertical; their size diminishes as the height of fall increases, and for falls of ordinary height they are very much smaller than the ordinary forms of so-called "vertical" water wheels, an advantage which increases with the height of fall. Their smaller size gives necessarily a high velocity of rotation, which constitutes their most important advantage over the older forms of wheel; it permits the adoption of less heavy and expensive machinery for transmitting the power, dispenses with gearing, and gives greater regularity of speed and nearly equal efficiency under all heights of fall. The turbine was introduced into general use by Fourneyron in France in 1827, and soon after by Fairbairn in England and by Boyden in the United States. Turbines are classed as outward-flow, inward-flow, and parallel-flow wheels, according to the direction taken by the water in passing through them; but the principle already enunciated applies to all. Could the water be entered upon the wheel absolutely without shock, and discharged absolutely without velocity, the efficiency of the wheel would be perfect, and the energy of the fall would be all transformed into work. The efficiency of good turbines, under favorable circumstances, approaches 80 per cent., and has been known to exceed that figure; the usual value is about 75 per cent. The efficiency is determined as follows: The amount of water flowing through the wheel is ascertained by gauging; its weight, measured by the height of fall, indicates the maximum power of the stream, or the power available. The actual amount of power utilized by the wheel is determined by measurement with the dynamometer. If R = the resistance and v = the velocity with which the wheel overcomes that resistance, $R \times v$ = the work done in the unit of time, and $Rv = WhC$, in which expression W is the weight of water flowing per second, h the height of fall, and C the coefficient of efficiency, or that fraction of the total available fall which is actually utilized by the wheel; the value of C is the "modulus" of the wheel. This value is capable of being estimated with approximate accuracy by the designer of the wheel, and the performance thus predicted, by the use of formulas involving quantities dependent in magnitude upon the forms of the guiding channels. Turbines give the highest efficiency when their speed is between 0·5 and 0·7 of that due to the height of fall. The velocity of direct flow, or that with which the water passes through the wheel, is to be preserved as nearly uniform as possible, and the passages are to be given such form and magnitude of cross section as will insure that uniformity. The velocity of whirl is made as nearly as possible equal to the rotary velocity of the wheel, and the water is thus passed upon the wheel without shock. It should glide over the buckets without sudden change of velocity, and should finally pass out with a speed opposite in direction and equal in magnitude to that of the wheel, thus dropping out of the wheel with the least possible velocity of flow, and with its original *vis viva* transformed into mechanical energy. Fig. 1 is a vertical section exhibiting the construction of the Boyden outward-flow turbine, made by the Holyoke machine company. A is a quarter-turn leading the water smoothly upon the wheel; B is the lower curb; C the disk carrying the guides; D the wheel with its guide channels, shown with the guide curves more perfectly in the plan, fig. 2; E is a disk connecting the wheel to its vertical shaft; F, G, G′ are supporting beams; S the shaft; I the support for the bearings; J the driving gear; and R the apparatus for moving the gate. In the Boyden wheel is illustrated the outward-flow turbine. In the inward-flow wheel, the water enters between guide curves, or is carried in a spiral channel, and the form of the buckets of the wheel is modified in accordance with the principles already stated, and gives the form seen in plan in fig. 3, in which A is the wheel disk and B is the shaft. In the parallel-flow turbine the water enters upon the wheel as in fig. 4, which represents the Bodine turbine. It is cased in so that it may be set at any point in the fall, utilizing the so-called suction of that part below it, as well as the pressure due to the column above it, a method of arrangement first introduced by Henschel and Jonval. The wheel was invented by Fontaine. The upper set of guides are fixed; the lower set are the wheel buckets. In the Burnham turbine, fig. 5, the inward and downward flow forms are combined to make a wheel of very high efficiency, while yet cheap in construction and durable. In the Leffel wheel, fig. 6, the stream is divided to obtain the combined inward and downward flow and to secure greater effectiveness, and also to obtain more perfect regulation. This form has been extensively introduced in the United States, as has also the preceding. The same letters denote the same parts in each figure. The arrows indicate the direction of flow. In Schiele's inward-flow turbine the water divides on entering the wheel, a part passing out above, the remainder emerging below, the wheel disk. The Fourneyron out-

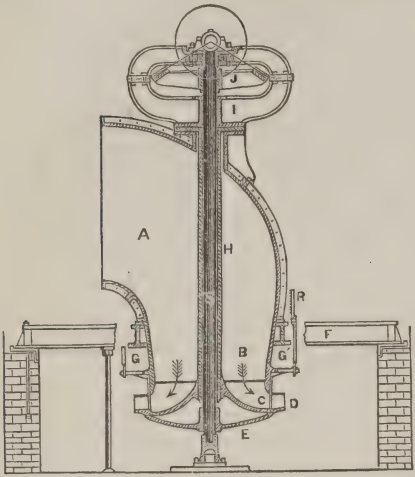


Fig. 1.—Section of Boyden Turbine.

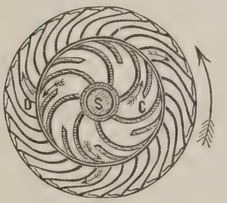


Fig. 2.—Plan of Boyden Turbine.

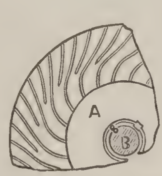


Fig. 3.—Inward-flow Turbine, Plan.

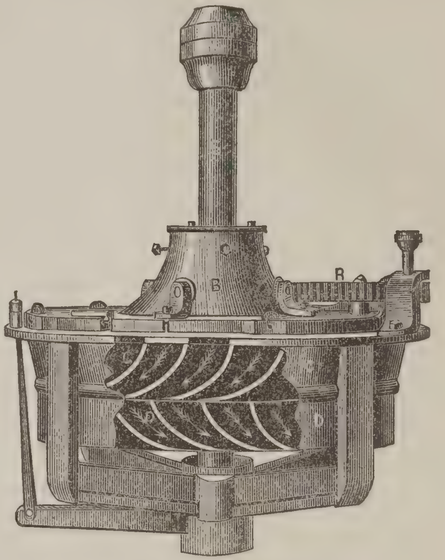


Fig. 4.—Bodine Turbine, Parallel Flow.

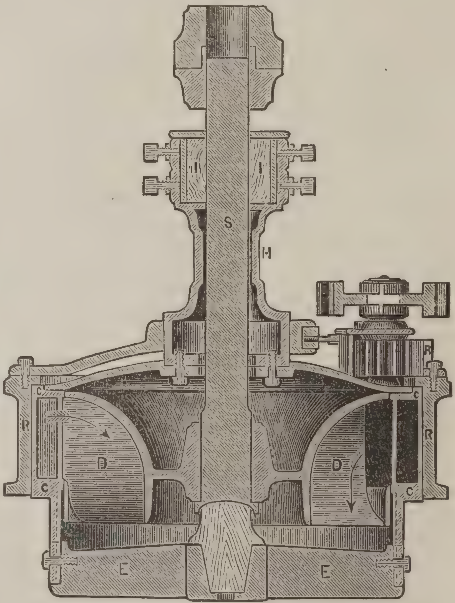


Fig. 5.—Burnham Turbine. Inward and Downward Flow.

ward-flow and the Jonval parallel-flow turbines are most used in Europe. Regulation is effected by a vertically sliding gate (R, fig. 1), by a set of valves at the entrances to the wheel (figs. 4, 5, 6), or by varying the positions of the guide blades themselves. The most perfect method would be by varying the velocity ratio of the wheel and the driven mechanism. The loss of efficiency in reducing the power of the wheel by regulation is often serious. Rankine states this loss as follows:

Opening	1	$\frac{1}{2}$	$\frac{2}{5}$	$\frac{1}{5}$
Ratio of efficiency	1	$\frac{5}{6}$	$\frac{2}{3}$	$\frac{1}{2}$

Whitelaw's turbine is a simple form of wheel without guide blades. Barker's mill was a very rude apparatus consisting of a vertical spout surrounding the shaft and conducting the water to hollow horizontal arms, from the extremities of which it emerged tangentially to the orbit of the orifices. These wheels are usually known as reaction wheels; their efficiency is comparatively small.—See Francis, "Lowell Hydraulic Experiments" (Boston, 1855); Rankine, "Steam Engine and Prime Movers" (London, 1859); and Mahan, "Hydraulic Motors" (New York, 1873).

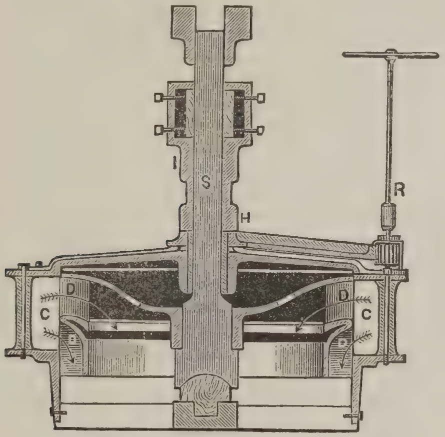
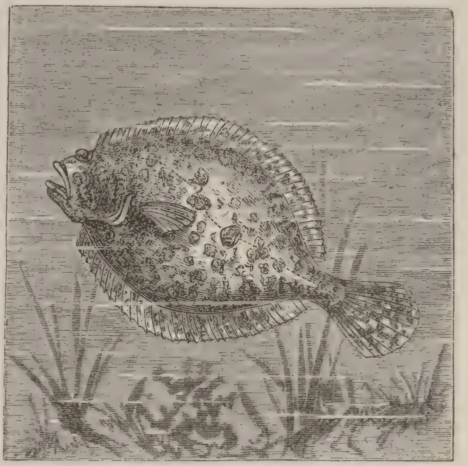


Fig. 6.—Leffel Turbine. Divided Flow.

TURBOT, a marine, soft-rayed fish of the flatfish family, and genus *rhombus* (Cuv.), characterized by minute sharp teeth on the jaws and pharynx, the dorsal fin commencing on the head in front of the eyes, and like the anal extending to the tail, and the eyes on the left side. The European turbot (*R. maximus*, Cuv.), the finest of the family, sometimes measures 6 ft. in width, and weighs over 200 lbs.; the left side is brown and covered with small tubercles, and the right side or lower surface smooth and white; without the tail the body is nearly round; mouth large, opening obliquely upward; eyes in a vertical line, one over the other; gill openings large; pectorals small. It keeps on sandy grounds, and is a great wanderer, usually in companies, living near the bottom, and feeding on small fish, crustaceans, and mollusks; though voracious, it is particular in its choice of food, and will bite at none but fresh bait; the spawning season is about August, after which it soon recovers its good condition. Its flesh is white, fat, flaky, and delicate, and has been highly esteemed from remote antiquity; it is disputed whether this or the next species was the *rhombus* of the ancient Romans; the French call it water or sea pheasant on account of its fine flavor. Though not uncommon on the coasts of Great Britain, most of the turbot sold in the English markets are caught by Dutch fishermen on the long line of sandy banks between England and Holland. The fishery begins about the end of March and closes by the middle of August, and is prosecuted both by lines and trawl nets.—The brill, pearl, or smooth turbot (*R. vulgaris*, Cuv.) is a smaller and less delicate species, with smooth scales, from the same localities; the under jaw is the longer, and the upper eye a little behind the lower; it is reddish sandy brown, varied with darker, and sprinkled with white pearl-like specks; under surface smooth and white; it is found in the Mediterranean, as are several other species still less esteemed. —The American or spotted turbot (*R. maculatus*, Girard; *pleuronectes*, De Kay), called also New York plaice and watery flounder, is from 12 to 18 in. long, and 6 to 8 in. wide, sometimes attaining a weight of 20 lbs.; it is smooth, on the left side reddish gray with large circular or oblong darker blotches surrounded by a lighter margin, and with numerous white spots, especially on the fins; the lower surface white and spotless; iris silvery; gape wide, with a single row of separate, large, sharp teeth, and a protuberance on the chin; ends of dorsal rays free; body elongated; it resembles the brill more than any other Euro-



European Turbot (Rhombus maximus).

pean species. It occurs along the coast of the New England and middle states, and is a delicate article of food.

TURENNE, Henri de La Tour d'Auvergne, viscount de, a French soldier, born in Sedan, Sept. 11, 1611, killed near Sasbach, Germany, July 27, 1675. He was the second son of Henri de Bouillon, prince of Sedan, by Elizabeth of Nassau, daughter of William I. of Orange, and was sent when a boy to Holland to learn the art of war under his uncle Maurice. In 1630 he entered the service of France, received the command of an infantry regiment, distinguished himself in Lorraine under Marshal de La Force, became *maréchal de camp* in 1635, and served under La Valette in Germany, where he relieved Mentz, then besieged by the imperialists. In 1637, with an auxiliary corps, he joined the Swedish army under Duke Bernhard of Weimar, and captured several towns. In 1639, under the count d'Harcourt, he defeated the united Austrians and Spaniards at Casale, and in 1640 forced Turin to surrender. In 1642 he conquered Roussillon from Spain. After the accession of Louis XIV. he was made marshal of France, and placed in command of the army in Germany. He crossed the Rhine, worsted the Bavarians under Mercy, acted in concert with Condé in the three days' battle at Freiburg (1644), was defeated by Mercy at Mergentheim, May 5, 1645, but gained a victory over him in conjunction with Condé at Allersheim, near Nördlingen, three months later, and, joining the Swedish general Wrangel, conquered the Bavarians at Lauingen and Zusmarshausen, and forced the elector to sign an armistice in March, 1647. He then went to Flanders, and took several places, but was stopped in his career by the termination of the thirty years' war (1648). On his return to France, his love for the duchess de Longueville and his brother's example connected him with the Fronde. At the head of a Spanish army which was sent to support that movement, he was defeated near Rethel by Marshal Duplessis-Praslin, and driven out of France (1650). After vain efforts to reconcile France and Spain, he was permitted to return home, and henceforth proved the most loyal supporter of the king, while Condé became the leader of the Fronde. He defeated Condé's troops at Bléneau in April, 1652, followed him up to Paris, and inflicted upon him a severe loss in July in the faubourg St. Antoine, and thus secured the triumph of the royal cause. The Spaniards having invaded the north of France under Condé, he worsted them at Arras in 1654, gained the decisive victory of the "Dunes," June 14, 1658, and took Dunkirk. These successes hastened the peace of the Pyrenees, Nov. 7, 1659. In addition to his previous rank as minister of state, he now received that of marshal general. In 1667, war being declared against Spain, Turenne entered Flanders at the head of the army, accompanied by Louis XIV., and in less than four months conquered that province; and several of his conquests were confirmed by the treaty of Aix-la-Chapelle, May 2, 1668. In the war against Holland (1672) he commanded one of the invading armies; and when the European powers came to the rescue of the Dutch, he entered Germany, advanced to the Elbe, and forced the elector of Brandenburg to a separate peace in 1673; then, in a campaign celebrated for his skilful strategy, he protected Alsace from invasion (1674), crossed the Rhine at Philippsburg, routed the enemy at Sinsheim and Ladenburg, and drove them back to the Main, and devastated the Palatinate, burning 30 towns. In the following winter, with an army of scarcely 22,000 men, he nearly destroyed 60,000 Austrians and Brandenburgers under Bournonville, gaining victories at Mühlhausen (Dec. 29, 1674) and Türkheim (Jan. 5, 1675). He now wished to retire from active service; but he was the only French general capable of coping with Montecuculi. He therefore continued in command, and during four months the manœuvres and strategic operations of the two generals were subjects of universal admiration. Finally Turenne forced his rival into a position near Sasbach where he was constrained to fight at a disadvantage; the French commander consequently had a new victory in prospect, when, surveying the last preparations on the eve of the battle, he was killed by a stray ball, and his death caused his army to retreat beyond the Rhine. Turenne was originally a Protestant, but became a Catholic about 1668 through the influence of Bossuet.—See Ramsay's *Histoire de M. Turenne*, including his *Mémoires* of the campaigns of 1643–'59 (French and English, Paris and London, 2 vols., 1735; new French ed., 1838), and Neuber's *Turenne als Kriegstheoretiker und Feldherr* (Vienna, 1869).

TURF, The, a term signifying horse racing in all its forms, except the few trotting matches which are decided on turnpike roads in England. It was no doubt derived from the level ground and short close greensward of the heaths, downs, and commons upon which races were first run in England. These tracts had never been ploughed from time immemorial. The moist climate and strong soil kept the grass thick; and as the pasturage was free to all the inhabitants of the parish, it was of that close velvety texture upon which the horse likes to extend himself. Horse racing in Britain is of great antiquity, though racing at stated times and places cannot be traced beyond the reign of James I., who gave a Mr. Markham £500 for an Arab horse called the Markham Arabian, which being run against English race horses was easily defeated several times. This horse was believed to be the first pure Arabian imported into England. The consequence was that the old English race horse and the Turkish horses from the Levant, with barbs from Morocco and Andalusia, were preferred to the Arabians for some time. In the reign of Charles I.

a horseman named Place had a white horse which was known, and is still known in the stud books, as Place's White Turk. He had great merit as a stallion. When the Puritan sects prevailed, horse racing, in common with all other forms of popular amusement, was suppressed. But Cromwell took Place into his service, purchased his White Turk, and did all in his power to improve the breed of English horses. After Charles II. came to the throne, horse racing was revived all over the country. He imported four (or as some accounts say, six) mares from Tangier, and these have ever since been known as the Morocco or royal mares. Some of them enter into nearly all the old pedigrees. In the reign of Charles II. racing was again regularly established at Newmarket, where it has flourished ever since. During the short reign of James II. there is little to be said of the turf. In that of William and Mary it flourished greatly, and the first of the three great patriarchal imported sires became known in England. This was the Byerly Turk, a horse ridden by Capt. Byerly as a charger in William's army after James was expelled from the throne. This horse was first noticed in England in 1689. Where he came from nobody knows; but some of the best race horses and stallions that ever lived came from him. Jig was his son, and Partner his grandson; and King Herod, a horse to which we have been as much indebted as to Eclipse for the speed and bottom of our race horses for a century, was his descendant at four removes. A large number of Barbary and Turkish horses were also imported, one of the best of which was the Lister or Stradling Turk; and a gray Arabian called Bloody Buttocks, from a red mark on his haunch, was also of much merit. But the greatest of all the importations was in the reign of Queen Anne, when a Yorkshireman named Darley received from his brother in Palestine a bay Arab horse obtained from one of the desert tribes. This horse, afterward called the Darley Arabian, was the second and the greatest of the three sires from which the blood horse of modern times is mainly descended. From him starts the right male line of Eclipse and of Snap, and the King Herod line on the side of his dam. In 1715 the Darley Arabian got Flying Childers, the best horse by long odds that had ever run in England. The Darley Arabian also got Bartlett's Childers, who did not race himself, but was a famous stallion, great-grandsire of Eclipse on the male side, and sire of the Little Hartley mare, whose name appears in the pedigrees of many of the best horses of the present day. The Darley Arabian also got Snip, the sire of Snap, the latter a sire of such immense merit and enduring influence that he is third to King Herod and Eclipse. The racer was at first a cross-bred horse, composed of the old English breed and Spanish, Barb, Turk, and Arab strains, but improved by good feed and care and development on the turf. The Godolphin Arabian was the third of the three great foreign sires. It is now generally believed that he was a Barb instead of an Arabian. He was foaled about 1704, and sent as a present to Louis XIV. of France by the emperor of Morocco. He was deemed of little value in France, and was purchased by a Mr. Coke, who took him to England and sold him to one Williams, the keeper of a coffee house in London. This man gave him to Lord Godolphin, who bred many famous racers from him. The blood is nearly as much esteemed as that of the Darley Arabian, and perhaps more than that of the Byerly Turk.—It does not appear that any records were kept of the races even at Newmarket before the beginning of the 18th century. No horses ran until they were five years old, and the races were nearly all four miles or a greater distance. Basto, by the Byerly Turk, one of the very earliest of those whose exploits are recorded, was foaled in 1703. Bay Bolton was foaled in 1705. The first time of his running he won Queen Anne's gold cup at York for six-year-olds, four-mile heats, weights 168 lbs. Bay Bolton beat eight six-year-olds, giving them a year each. He was a successful stallion, and his daughter Gypsy was celebrated as a brood mare. Brocklesby Betty, a chestnut mare by the Curwen Bay Barb out of a little mare by the Lister Turk, was foaled in 1711. Before she was trained she had a foal, but she was the best race horse that appeared in England before Flying Childers. The latter, a chestnut horse with four white legs and a blaze in the face, was foaled in 1715, and was got by the Darley Arabian out of Betty Leedes. Flying Childers had immense speed and thorough bottom. He did not run much, for after he had shown his powers no one would start a horse against him. On one occasion, it is said, he ran over the Beacon course, 4 m. 1 fur. 138 yds., in 7 min. 30 sec. His stride was 25 ft. With his rider in the saddle, he leaped 30 ft. on level ground. He was a horse of fair size, and so was his brother Bartlett's Childers. After their time the thoroughbred horse increased much in height and length. Still some of the best and most enduring of that age were mere ponies. Gimcrack and Little Driver were only about 14 hands high. King Herod, a horse of fine size and power, was bred by the duke of Cumberland in 1758, and sold to Sir John Moore. He came in the male line of the Byerly Turk through Tartar, Partner, and Jig, and on the side of his dam he had two crosses of the Darley Arabian, one through Flying Childers and one through a daughter of the Arabian. King Herod had great speed and bottom. There have been better race horses, while it is agreed that there has been no better stallion. Between the time of Flying Childers and Eclipse 50 years elapsed, and many famous horses were produced, including Snap as well as King Herod. The former was son of Snip, whose sire was Flying Childers; and it is through the daughters of

Snap and the progeny of King Herod that we have so much of the invaluable blood of that famous horse at the present day. In 1764 another colt was bred by the duke of Cumberland, which proved a greater runner than any of its predecessors, and a larger horse. He was foaled during the great eclipse of the sun, and was called Eclipse. His sire, Marske, was a brown horse coming in the male line from the Darley Arabian through Bartlett's Childers; and his dam, Spiletta, was a granddaughter of the Godolphin Barb. Eclipse was the biggest, strongest, and greatest race horse that had ever run in England. He was 16 hands 2 in. high at the withers, one inch more at the croup, and his length was enormous. No such horse had ever been seen before. His temper was resolute and defiant. There was great trouble in breaking and riding him. No jockey ever dared strike him with the whip or prick him with the spur. He won eleven king's plates, most of them four-mile heats, weights 168 lbs. He double distanced a large field of good horses when his backer for a heavy bet undertook to place them. He was never defeated, and never paid a forfeit. Next to him the two best horses of his time were Goldfinder, son of Snap, and Shark, another son of Marske. The latter got big horses. Shark was himself 16 hands high, and was a great runner. He was afterward taken to the United States. In the 50 years between Flying Childers and Eclipse the race horse had increased about a hand in height, and when the latter retired from the turf in 1770, the thoroughbred, as a permanent and the most valuable variety of the horse, was established. There were now at the stud King Herod, Eclipse, and Snap, and from these three our best modern race horses are mostly descended. It would be difficult to find a race horse that has not the blood of two of them, and most of the best in England, America, and France take descent from all three.—When Eclipse retired, a great change in the management of the race horse was imminent. Up to that time few had run before they were five years old. Lord Grosvenor bred Pot-8-os from Eclipse and Sportsmistress in 1773. He ran him at three years old, and the colt won. At four he was beaten; but after he was five he never suffered defeat. He won over the Beacon course 20 times with high weights, and was the best son of Eclipse, though the latter had other sons of wonderful merit, such as King Fergus, Joe Andrews, Mercury, Dungannon, and Saltram. The whip, a challenge trophy still run for over the Beacon course, 140 lbs., and for 200 guineas, play or pay, whenever challenged for, had been established. Bay Malton had won it and held it. So had Mambrino, but he paid Shark 100 guineas to be allowed to keep it. In 1781 Lord Grosvenor challenged for it, and named Pot-8-os. It was delivered over. While Eclipse rejoiced in Pot-8-os, King Herod enjoyed equal glory through the wonderful success of his son Highflyer, foaled in 1784. He was bred by Sir Charles Bunbury, and sold to Lord Bolingbroke, and afterward to old Tattersall, the founder of the fortunes of that family. To Highflyer it is indebted for wealth and renown. His dam was Rachel, by Blank, son of the Godolphin Barb and the Little Hartley mare; and on the female side Rachel was a granddaughter of Regulus, son of the Godolphin Barb. Thus Rachel brought two crosses of the Godolphin Barb and one of the Darley Arabian to the cover of King Herod, who had himself two crosses of the Darley Arabian and one of the Byerly Turk. Highflyer ran at three years old. He won several times over the Beacon course, besides races at other places than Newmarket. He was never beaten, and never paid a forfeit. A hot discussion soon arose as to whether the descendants of King Herod or those of Eclipse were the best, and this lasted even after Hambletonian, grandson of Eclipse, beat Diamond, grandson of King Herod, in the great match over the Beacon course, by half a neck. The Diamond men wanted to run it again, but Sir Harry Vane Tempest would not consent, and Hambletonian never ran another race. The betting on this race was enormous. The war between the partisans of Eclipse and King Herod now waxed furious. The wise and impartial, however, determined to avail themselves of the blood of both these famous horses. Then began that curious and intricate crossing between the produce of King Herod and Eclipse and the daughters of Snap, which has ever since produced the horses of highest type in England, Ireland, America, and France. King Herod covered Lisette by Snap, and got Maria. This latter was bred to Pot-8-os, and the produce was Sir F. Poole's Waxy, a beautiful bay horse with one eye, great as a racer, and upon the whole greater than Highflyer himself as a sire. His favorite mate was Penelope by Trumpator. She was out of Prunella by Highflyer, and Prunella's dam was Promise, by Snap, the dam of Promise being a mare by Blank, son of the Godolphin and the Little Hartley mare. Whoever would understand what the turf means must acquire some knowledge of the true origin of the best families of the blood horse. Penelope had the Darley Arabian blood through Snap, grandson of Flying Childers, and through the Little Hartley mare, daughter of Bartlett's Childers. She also had two crosses of it through King Herod, and one more through Rachel by Blank, dam of Highflyer. She had the blood of the Godolphin Barb twice through his son Blank, and once through his son Regulus; and she had the blood of both these horses once more through her sire Trumpator. She had besides the blood of the Byerly Turk through King Herod once and through the dam of Trumpator once. Now, being put to Waxy, son of Pot-8-os by Eclipse and Maria, by King Herod, out of Lisette by Snap, Penelope produced for the duke of Grafton in six successive years, beginning with 1807, Whalebone, Web, Woful, Wilful, Wire, and Whisker. All these were great race horses, winners at four-mile heats with heavy weights. Whalebone, Woful, and Whisker were great stallions. Web and Wire were famous brood mares. The latter, after winning many races for the duke of Grafton in England, was sold by him to Mr. Bruen for 4,000 guineas. He took her to Ireland, where she won, the first season, the lord lieutenant's plate, four-mile heats on the Curragh of Kildare, 4,000 guineas in stakes, and 20,000 guineas in bets. From that time the Irish turfmen got hold of all the Waxy and Pot-8-os blood they could secure. They bought Waxy Pope, who was by Pot-8-os out of Prunella, and being unable to purchase either Whalebone or Whisker, they eagerly seized upon their best sons, Sir Hercules and Economist. The former got Irish Birdcatcher and Faugh-a-Ballagh, whose son Leamington is now highly prized here. Economist got Harkaway, and also the dam of the Baron, by Irish Birdcatcher. The Baron, thus in-bred to the brothers Whalebone and Whisker, struck the blood of their sister Web in Pocahontas by Glencoe, and from her produced Stockwell and Rataplan, two of the best horses that ever lived. This brings that line to our time, for Rataplan's daughter Mandragora is still producing, and is the best brood mare in the world. Her dam was Manganese, daughter of Irish Birdcatcher, Rataplan's grandsire. Mandragora belonged at the time of his death to the late Rev. Mr. King, vicar of Launde, for whom she bred Apology, winner of the Oaks and St. Leger in 1874. One other great line in which the blood of King Herod, Eclipse, and Snap is mingled, should be mentioned. Highflyer's best son was Sir Peter Teazle, whose dam was Papillon by Snap. Sir Peter, a splendid race horse, a great four-mile-heat winner, and a stallion whose excellence was only surpassed by that of Waxy, was owned by the earl of Derby. Papillon had the blood of both the Childerses, she had that of the Godolphin Barb, and also of the dam of the two True Blues, which mare was by the Byerly Turk. Out of Arethusa by Dungannon, son of Eclipse, Sir Peter Teazle got Walton in 1798, and Williamson's Ditto in 1799. From Walton and Parasol, by Pot-8-os, came Partisan, sire of Venison. The latter got Kingston, whose grandsons Kingfisher and Glenelg are among our young stallions in the United States. Partisan was also sire of Gladiator. Gladiator was sire of Queen Mary, dam of Balrownie, Bonnie Scotland, Blink Bonny, Caller Ou, &c. He was also sire of Miss Gladiator, dam of the great French race horse Gladiateur. Web, by Waxy, was grandam of Glencoe, the best horse that ever came to America. Being bred to Tramp, a horse closely descended from Eclipse in the male line, and from King Herod in the female line, Web produced Trampoline. Trampoline was bred to Sultan, a horse taking from Eclipse, King Herod, and Snap in several different lines, and she produced Glencoe. Glencoe was third in the Derby. He won the Goodwood cup and other races when three years old. When he was four, Lord Jersey challenged for the Whip and named him. But though he was only a colt and it was even weights, 140 lbs., Beacon course, nobody would run against him, and it was delivered over. Glencoe was foaled in 1831, at a time when the mischievous influences which have since affected the English turf and jeoparded the excellence of the blood horse had not obtained great sway. The running of two-year-olds, though common enough, was not the rule as it is now. The system of handicapping, by which in theory the worst horse in a race is put upon a level with the best and all the rest, through different weights, had then hardly begun. It has since attained huge dimensions, and there are now run in England at least ten times as many handicaps, generally over short distances, as of all other races put together. It is believed that this system, with its multitude of short dash races, has had a pernicious effect on the throughbred horse in respect of stamina. Handicapping afforded a chance for a middling horse to win much more money than the best of his time could, especially if the latter did not attain to his greatest excellence until he was four years old. It secured very large entries and big fields, and enabled professional betting men to extend their operations vastly. —Up to the time when Glencoe was on the turf, there were a great many local country meetings in various parts of England, especially in the midland counties, where fox hunting was most delighted in. At these races there were no very large prizes to bring the great horses from Newmarket, Epsom, and Yorkshire, and there were no railroads to afford them ready conveyance. The consequence was that the running horses were mostly those bred and kept in the neighborhood, and as a rule they were fast, stout, and honest horses. Many of the races were heats. The courses were chiefly staked out upon heaths, which were partly overgrown with gorse. There were no stands. The ladies viewed the races from carriages drawn up outside the foot people, who stood along the cords which roped in the home stretch. There were always a great number of mounted men. So popular were these gatherings that all the neighboring gentry, yeomen, farmers, and tradespeople made it a point to attend with their families. The country meetings have nearly all ceased, and few farmers now breed the blood horses which formerly ran at them. The great three-year-old race of England is the Derby, which was founded in 1780, and first won by Sir Charles Bunbury's Diomed, who was imported to the United States. He was the sire of Sir Archy here, first American ancestor in the male line of Timoleon, Boston, Lexington, and Monarchist. The Derby, a mile and a half, is run on Epsom downs, generally in the latter part of May. The Oaks, also a mile and a half, and run for at the same meeting, is for fillies only. It was founded the year before the Derby, and was first won by Bridget, daughter of King Herod. The Derby was called after the earl of Derby. The Oaks was named after a country seat in the neighborhood belonging to Gen. Burgoyne. The third of the great three-year-old races is the St. Leger, a mile and three quarters, run for at Doncaster in autumn. It was founded in 1778 and named after Col. St. Leger. Hollandoise, a mare by Matchem out of Virago by Snap, was the first winner. It was then two miles. Prior to the Derby and the Oaks, the Two Thousand Guineas and the One Thousand Guineas are run for at Newmarket. They are each a mile. The former is for three-year-olds and the latter for three-year-old fillies. Besides these there are sweepstakes for three-year-olds called Derbys at other places. The great cup races are at Ascot, Goodwood, and Doncaster. These are two miles and a half, weight for age, but winners of the Derby and Oaks are penalized, and at Goodwood there are so many penalties for winning horses, and allowances for poor ones, that it is practically a handicap. The fields are small for the cups, for many people do not know what to do with a grand classical trophy of silver, about three feet high, even if they could win it. The royal plates are still run for. They are now commonly from two to three miles, and very few enter. The other cup races are mostly handicaps. The handicap races, from the Great Metropolitan, Goodwood stakes, Cesarewitch, Chester cup, &c., which are all two miles or more, range down to half a mile, and there are immense numbers of them. Those which are only a mile or less than a mile vastly outnumber those in excess of it. Over 2,000 race horses ran in England in 1875.—The thoroughbred horse of England and America is practically identical in breed, and in all probability there is no difference in quality where the treatment while young and the training and riding are the same. The noted training families, such as the Dawsons and Days, have been at it in England for about a century, and son succeeds father in the profession. The most successful breeder in America, for the number of mares he has kept, is John M. Clay of Kentucky, and he was always noted as the most generous and careful of feeders. He had much success with Magnolia and Topaz, daughters of Glencoe, and with Balloon, daughter of Yorkshire, and he preferred Lexington to all other stallions. His father, the great Henry Clay, established him as a breeder in some sort by making him a present of imported Yorkshire, a very fine race horse and excellent stallion. Nothing in this country ever surpassed the cross between Lexington and the daughters of Glencoe. It produced Kentucky, Norfolk, and Asteroid, all in one year; and more recently it was represented by Monarchist, a magnificent race horse. In the male line Glencoe is now represented here chiefly by Virgil, son of Vandal. But upon his daughters his towering fame chiefly rests. The progeny of his English daughter, Pocahontas, are numbered by hundreds, perhaps thousands, and their fame is world-wide. The greatest breeding establishments in this country are those of Mr. Alexander and Mr. Sanford in Kentucky. At the latter there are 5 stallions and 75 brood mares. Mr. Grinstead and Mr. McGrath are also eminent breeders in Kentucky. Capt. Cottrell of Mobile breeds largely. Near New York there are the large and well appointed breeding establishments of Mr. Belmont, Mr. Cameron, Mr. Withers, Mr. Welch, Mr. P. Lorillard, Col. McDaniels, and Mr. Morris. At the great establishments the produce are mostly sold when yearlings. Mr. Backman, Mr. Robert Bonner, Col. Russell of Boston, and many other gentlemen breed trotting horses.—The race courses of England are all greensward, and few of them are quite flat. In this country they are of dirt and generally flat. The usual shape is two straight parallel stretches of a quarter of a mile each, with curves at the ends a quarter of a mile in radius. Some are faster than others, a condition largely depending upon the soil; loam is the best. When dry and moderately hard on the surface, with a damp subsoil, the track is fast. The harder the track, the faster it is, provided it is not hard enough to make the horse sore and unwilling to extend himself. A soft track to train on and a hard one to run or trot on conduces to speed. Sand is slow. The Saratoga course is the fastest in the country, and that of Jerome Park, New York, is one of the slowest. The best four-mile performances have been by Lexington, 7 min. 19¾ sec., at New Orleans; Lecompte, 7 min. 26 sec., at the same place; Idlewild, daughter of Lexington, 7 min. 26¼ sec., at Centreville course, Long Island, with 14 lbs. more weight than her sire and Lecompte carried; Fellowcraft, son of Australian and Idlewild's sister, 7 min. 19½ sec., at Saratoga; and Wildidle, son of Australian and Idlewild, 7 min. 25½ sec., at San Francisco. Among the best horses of the last 15 years have been Lightning, Daniel Boone, Planet, Albino, Idlewild, Jerome Edgar, Blackbird, Thunder, Norfolk, Kentucky, Asteroid, Harry of the West, Longfellow, Kingfisher, Harry Bassett, Monarchist, True Blue, Tom Bowling, Wanderer, Springbok, Preakness, and Foster. The last two are very tough veterans. They are both by Lexington, both out of daughters of Yorkshire, and their grandams were both imported mares. Out of those mentioned 15 were got by Lexington, who died in 1875. As a stallion his value was enormous, and he succeeded best with mares having much English blood, such as the daughters of Glencoe, Yorkshire, Albion, Leviathan, &c.—*Steeple-Chasing.* About 1830 annual steeple chases were organized in the vale of Aylesbury and at St. Albans. The distance was commonly four miles as the crow flies. The men might get to the goal any way they could, provided their horses brought in their proper weight, and that they never went a hundred yards at one time along any road, lane, or highway, nor opened any gate or wicket. The courses were nearly straight, but a rider might diverge within certain limits marked by flags. Few could see the steeple chase from end to end. At that time the vale of Aylesbury was chiefly rich pasture land. The sod was old, and very tough in winter and early spring, the season for the steeple chases. There were no stone walls, and very few post-and-rail fences. The fields were enclosed by ditches and double hedges, called bullfinches and ox fences, because capable of confining oxen in their pasture. The hedges were chiefly composed of the hawthorn, blackthorn, and crab apple, together with wild roses and a great variety of briers. When in leaf such a fence could not be seen through, but in winter the young growth of the top, though wide, was neither very thick nor interlaced. No horse could go through such a fence without jumping more than breast high, and no horse that ever lived could clear the bullfinches by going clean over them. But good horses and resolute men could clear the old, stubborn part of the hedges, and go through the top-hamper bodily. The ditches were no impediment. The horse rising to the leap did so before he neared the ditch on the taking-off side, and if he got through the hedge he was pretty sure to clear the ditch on the far side. But the vale was intersected by wide and deep brooks. The natural brook flowing through a meadow and nearly full to its bare banks is much more formidable to the steeple chaser than the artificial brook with a fence on the taking-off side. Horses will jump a fence and brook readily enough, though they may know by experience that the water is beyond the fence; but many will refuse at naked water, especially when it glistens in the sunshine. The weights at Aylesbury, St. Albans, and other places were at first 168 lbs. It was the custom to choose a stiff four miles for the chase, that is, a line in which the fences were difficult, and the brooks wide and deep. Handicapping was introduced, to stop the further winning of two famous horses, Lottery and Gaylad, who took all the best prizes for several years. It was begun at Newport-Pagnell, but Lottery won with 180 lbs., and Gaylad was second. As soon as the handicap system was established, reports became rife about pullings. The steeple-chase course was mostly out of sight of the stewards, and a rider could pull his horse without fear of being detected. This, in part, brought about the modern system of round courses, over which the horses generally go twice and are in sight nearly all the way. So popular was steeple-chasing that those who could provide the land and construct the fences and stands were well repaid by fees and rentals when the spectators had a chance to see the chase. But the fences and brooks were artificial, and much less difficult than those of the real cross-country lines. The consequence was that a slighter and lighter sort of horse was trained to the business. The most famous of the old steeple-chasers ranged from about three quarters or seven eighths blood to quite thoroughbred. A large number of steeple-chase courses now exist in England, but not one of the old straight lines across the country is used. The chief of all is the Grand National Liverpool steeple chase. The course is about four miles and a half. The fences are fair. Beecher's brook (so called from Capt. Beecher, a noted steeple-chase rider) is 18 ft. wide, with a fence on the taking-off side from 3 ft. 8 in. to 4 ft. high. Most of the artificial water jumps in England are from 14 to 18 ft. wide. The weights range from about 175 lbs. to 140 lbs., and neither the high weights nor the low weights often win. The good steeple-chaser always takes his jumps in stride, and rushes at them rather than pauses. Chandler jumped 39 ft. over water, and 34 ft. has been cleared over hurdles. Steeple-chasing is very popular in Ireland, and the Irish horses have a cat-like aptitude for jumping. There were in England and Ireland, in the season commencing late in the autumn of 1874 and ending in the early summer of 1875, about 400 steeple chases, exclusive of those for only trifling stakes. During the same time the hurdle races were more numerous. In these the race is run over the flat course, but with hurdles about 4 ft. 8 in. high, placed an eighth of a mile apart. The thoroughbred steeple-chaser is entered at hurdles first, and if he turns out to be a good, bold jumper, is practised at hedges, rails, &c., and last of all at water jumps. The steeple chases in this country are too confined and twist about too much to give either horses or riders a good chance. The jumps, such as they are, come too frequently. Half the number would be better.—*Trotting.* This is almost wholly confined to the United States and Canada. It consists of races in which the horses are required to trot, and if they break into a gallop the riders or drivers are commanded by the rules to pull them to a trot as soon as possible. Yet considerable running is done sometimes. Nowhere else has the trotting horse attained anything like the speed which has been displayed in America. Nothing has been systematically done for the trotter in Europe, except in Russia, where Count Orloff established a breed which still has fine action and a good deal of speed. The old roadster could not go faster than a rate of about 12 m. an hour, but he could go a long way. The modern, high-bred and highly educated trotter is capable of going a mile at the rate of 25 m. an hour, and better. The great factor in the improvement of the trotter has been the trotting turf. The trotter, like the thoroughbred of early times, was a cross-bred horse, and his development here and in Canada began very early in the history of the colonies. The people of the northern states and of Canada were led to prefer driving to riding. The roads in summer and autumn were comparatively good. In winter the deep snows made sleighing rapid and easy, and a man who would have been frozen on horseback could travel comfortably in a sleigh. In the southern states the case was different. Maryland, Virginia, and the Carolinas produced blood horses, but no trotters. The fact that the early home of the fast trotter was the northern states and Canada shows that his excellence is the result of long use, and the inclination for that gait is now become partly hereditary. When the people of New York, New England, and Canada were driving rapidly and merrily to the music of the sleigh bells, and their horses were compelled to bend the knee to get over the snow among the pines, they were creating the possibility of future Flora Temples and Dexters. The best mares were selected to breed from, and the best stallion in the neighborhood was chosen for them. Races for small sums were made upon the road or upon the ice, and finally trotting tracks were established at such places as Boston, New York, and Philadelphia. Some of the best trotting mares were bred to the sons and grandsons of imported Messenger, and the strains of other blood horses in this country and Canada were also infused. The Arabian horse also entered into the composition of the trotter. The form best adapted for speed in horses was thus approached, and the nervous organization and clear wind which enable the horse to stay over a long distance of ground were acquired. Upon the nervous organization depends the great difference often found to exist between horses equally well bred and apparently equally well shaped. In the early days of the trotting turf most of the races were under the saddle. There were also many of two-, three-, and four-mile heats. After some time races in harness became more frequent, and those of three- and four-mile heats less so. The sulkies and skeleton wagons employed in the races were improved in construction and made lighter and truer. The tracks were laid out upon proper principles, and better cared for. The horses, regularly trained, and with the improved vehicles and tracks, displayed more and more speed, until Flora Temple finally beat 2 min. 20 sec. in harness. Even after that time races of two-mile heats and wagon races were common; but they have now almost wholly ceased. Associations make all the races mile heats, three in five, in harness. About the last of the great two-mile-heat races and wagon races were those in which Dexter defeated Lady Thorn in 1866. It is to be regretted that all the trotting races should now be of one pattern. People have largely lost sight of the main things involved in the issue of a race, and care only for time by the watch, which is in truth the least important element in the matter. Some horses have beaten the best time made by other horses with whom they would have stood very little chance in a race together. The time test does more than justice to the horse tried by it, and less than justice to the horses of past years. All the improvements in tracks, vehicles, and mode of handling go to the aid of the latest comer. There is hardly a track in the country now so slow as that of Buffalo was when Dexter made his best recorded time, or so slow as the Fashion course was when he made his faster actual time. The new courses are very much faster, though they are of the right length measured three feet from the pole. The best recorded time for a mile in harness is now 2 min. 14 sec. made in a trial for time by Goldsmith Maid, in which she had no opponent. The fast trotter is not usually as tall as the running race horse, and many of the best have been rather under-sized. Flora Temple was not much more than 14 hands high; Ethan Allen is not 15; Goldsmith Maid is 15 and half an inch; Dexter is 15 and an inch. But George M. Patchen and Lady Thorn were 16 hands high, and Gloster, a famous fast horse that died in 1874 at San Francisco, was nearly 17 hands high. The Orloff trotter of Russia was a cross-bred horse when Count Orloff first exhibited him. It is believed to be now established as a breed, measurably capable of reproducing without reverting to the peculiar points of the original ancestors. The count at first made use of Arabian horses and of mares from Norway and Holland. The trotting habit was no doubt inherited from the mares, and improved by training. Afterward another Arab cross was employed, and one with the English thoroughbred horse. The speed of some of the Orloff trotters is good, and from their pictures they must possess a large amount of good blood.

TURGENEFF. I. Alexei, a Russian historian, born in 1785, died in Moscow in December, 1845. He was early engaged in collecting materials in foreign countries relating to the ancient history of Russia, and his researches resulted in the publication of *Historiæ Russiæ Monumenta*, under the auspices of an archæological government commission (2 vols., St. Petersburg, 1841–'2; supplement, 1848). His letters to his brother were published in Leipsic (1872.) **II. Nikolai**, a Russian author, brother of the preceding, born in 1790, died in Paris in November, 1871. He studied in Göttingen, and after being employed in the civil service at St. Petersburg he was appointed in 1813 Russian commissary, in conjunction with the Prussian statesman Baron Stein, in provisional charge of the German provinces recovered from France. After returning to Russia he rose to be deputy secretary of the interior and agriculture, and became much interested in the emancipation of the serfs. This involved him in the revolutionary outbreak of 1825, and he was sentenced to death, but escaped to Paris, where he spent the rest of his life. He wrote *La Russie et les Russes* (3 vols., Paris, 1847).

TURGENEFF, Ivan, a Russian novelist, born in Orel in November, 1818. He studied in Moscow, St. Petersburg, and Berlin, and in 1843 received a clerkship in the ministry of the interior. He was subsequently banished to the provinces on account of his liberal sentiments, and after several years was allowed to return to the capital; but he has since chiefly resided in Paris and Baden. He first made himself known by several works of poetry (1843–'4), but achieved much greater success by his "Memoirs of a Sportsman," an exquisite humorous picture of Russian rural life (2 vols., 1852), and subsequently by his "Fathers and Sons" (1862), "Smoke" (1867), and other novels. Most of his works, some of which he wrote in French, have been translated into English, German, and other languages. Among them are "Liza," "On the Eve," "Dmitri Rudin," "Journal of a Useless Man," and "A Lear of the Steppe."

TURGOT, Anne Robert Jacques, baron de l'Aulne, a French statesman, born in Paris, May 10, 1727, died there, March 20, 1781. He was educated for the church, and in 1749 became prior of the Sorbonne; but he abandoned the profession in 1752, studied law, and in 1753 became councillor in the parliament and master of requests. As early as 1745 he had published his *Lettre sur le papier-monnaie*, and he now applied himself to the study of natural philosophy, agriculture, manufactures, and commerce, publishing his views in papers in the *Encyclopédie* or in pamphlets. The most remarkable of these are his *Lettres sur la tolérance* (1753). In 1761 he was appointed intendant of Limousin, and introduced many reforms in the administration of that province; free transport was allowed to corn and breadstuffs, taxes were lessened, roads and highways improved, and workhouses and charitable institutions established. In 1771 appeared his *Réflexions sur la formation et la distribution des richesses*, his chief work on political economy. He also published papers on loans and on mines, and *Lettres sur la liberté du commerce des grains.* On the accession of Louis XVI. he was made comptroller general of finances, and undertook to improve the financial condition of the kingdom by freedom of labor at home and of trade abroad, and by substituting for taxes on a multitude of articles a single tax on land. These reforms were encouraged by the king, but were obnoxious to courtiers and many others. In 1775 he was charged with having caused scarcity by his regulations respecting the grain trade. In January, 1776, he caused an edict to be issued, abolishing compulsory labor for the state, internal duties on breadstuffs, the privileges of trading corporations, &c. But this only increased the number of his enemies; the privileged classes were so loud in their complaints that the king was afraid to support his minister, and Turgot was dismissed in May. His *Œuvres complètes*, published by Dupont de Nemours (9 vols. 8vo, Paris, 1808–'11), were reprinted under the supervision of Eugène Daire and Hippolyte Dusard (2 vols., 1843–'4). His biography was written by Condorcet (London, 1786).

TURIN (It. *Torino*). **I.** A N. W. province of Italy, in Piedmont, bounded W. by France; area, 4,068 sq. m.; pop. in 1872, 972,986. It is watered by the Po and its numerous affluents. The eastern and southern portions of the surface are level or hilly; the northern and western are traversed by lofty branches of the Pennine, Graian, and Cottian Alps, containing many glaciers. Among the principal products are wheat, maize, mulberries, melons, and hemp; in the valleys rice and silk culture, and in the mountains cattle raising and mining, are extensive. The province is divided into the districts of Turin, Pinerolo, Susa, Aosta, and Ivrea. **II.** A city, capital of the province, in a large plain enclosed by the Alps excepting on the northeast, at the junction of the Dora Riparia with the Po, 77 m. S. W. of Milan; pop. in 1872, 212,644. It is remarkable for its fine bridges, that on the Dora forming a single arch, large squares and broad streets, the monuments and palaces in the new town, and its delightful promenades bordered by villas. Of the ancient walls, only the Porta Palatina and one or two other parts are now standing. The piazza Castello contains many public buildings, and is surrounded by palaces which extend along the via del Po to the collina di Torino, a pretty range of adjacent hills. The royal palace, on the N. side

Porta Palatina.

of this square, is remarkable chiefly for its size, and for its large library and interesting armory. In the centre of the square is the old palace of the early dukes of Savoy, restored in 1718 for the mother of Victor Amadeus II. and since called palazzo Madama. On the N. W. tower of the palace is the royal observatory. Adjoining the same square are the military academy and the theatre. The piazza di San Carlo is almost surrounded by arcades. The oldest church is the cathedral, the finest is that of San Filippo. A Protestant church was opened in 1853. The academy of sciences contains the *pinacoteca* or royal picture gallery, with celebrated paintings, and the museums of antiquity and natural history. The university, founded early in the 15th century and reorganized in the 17th, has a magnificent building with a library of 200,000 volumes, increased in 1875 by Cavour's library, bequeathed to it by the marquis Ainardo Cavour. He also left 3,000,000 lire in real estate for the charity hospital, one of the largest of the numerous charitable institutions. A fine *campo santo* was opened in 1829. Despite the variable and occasionally rough climate, the mortality has lately averaged only 27·2 in 1,000, smaller than in other large towns of Italy. The chief export is silk. The principal manufactures are silk goods, jewelry, furniture, pianofortes, and carriages.—Turin was originally settled by the Ligurian tribe of the Taurini, whence the name. It was conquered by Hannibal, and under Augustus became a Roman colony under the name of Augusta Taurinorum. In the 6th century it was the capital of a Lombard duchy; in the 8th Charlemagne made it the capital of the marquisate of Susa; and in the 11th century it became that of the house of Savoy. The French held the city at various periods, but their army under La Feuillade and Marsin was signally defeated here by the imperialists under Prince Eugene, Sept. 7, 1706. They occupied it in December, 1798, and Suvaroff in May, 1799; and the French again held it from 1800 to 1814, when it was restored to the Savoy dynasty. It was the capital of the kingdom of Sardinia till 1860, and subsequently of Italy till May, 1865.

TURKEY (*meleagris*, Linn.), a well known gallinaceous bird, the type of the family *meleagridæ*, of the group *alecteromorphæ* of Huxley. The bill is moderate and strong, shorter than the head, compressed on the sides, with culmen arched, and upper mandible overhanging the lower; the cere is elongated into a loose, pendulous, round, fleshy caruncle; head and upper neck bare, with only a few scattered hairs, and carunculated; base of lower mandible sometimes wattled; a tuft of long, black bristles on the breast, largest in the males; wing short and rounded, the first four quills graduated, and the fifth and sixth the longest; tail broad and rounded, pendent during repose, but capable of being raised and extended like a fan; tarsi robust, longer than middle toe, covered in front with broad, divided scales, and armed with a short obtuse spur; anterior toes united at base by a membrane, the inner the shortest, the posterior moderate and elevated; claws short and slightly curved. All the species in the wild state are indigenous to North America. The common wild turkey (*M. gallopavo*, Linn.) is about 3½ ft. long and 5 ft. in extent of wings, weighing from 15 to 20 lbs.; the naked skin of the head and neck is livid blue, and the excrescences purplish red; the general color is copper bronze, with green and metallic reflections, each feather with a velvet-black margin; quills brown, closely barred with white; tail feathers chestnut, narrowly barred with black, and the tip with a very wide subterminal black bar; the female is smaller and less brilliant, without spurs, often without bristles on the breast, and with a smaller fleshy process above the base of the bill. It has a crop and gizzard, and an intestine four times the length of the body; the cartilaginous tissue of the stomach is less hard than that of the common fowl. The full plumage is attained at the third year; the females usually weigh about 9 lbs. They fly in flocks of many hundreds, frequenting woods by day, feeding on acorns, all kinds of grain, buds, berries, fruits, nuts, grass, insects, and even young frogs; they make considerable journeys in search of food, flying and swimming across rivers a mile wide; though their flight is heavy, they are able to reach with ease the tops of the highest trees; they are so strong as not to be easily held when slightly wounded; they perch at night on trees. Quitting the woods in September, they come into the more open and cultivated districts, where they are killed in great numbers; they were formerly abundant in the middle, southern, and western states, but are now rare except in thinly settled regions, and have never been found west of the Rocky mountains. Although the turkey was exclusively an inhabitant of North America in its wild state, the earlier naturalists supposed it to be a native of Africa and the East Indies, and its common name is said to have arisen from the belief that it originated in Turkey; it was carried to England in the early part of the 16th century by William Strickland, lieutenant to Sebastian Cabot. Since that time it has been acclimated in most parts of the world, but the

Wild Turkey (Meleagris gallopavo).

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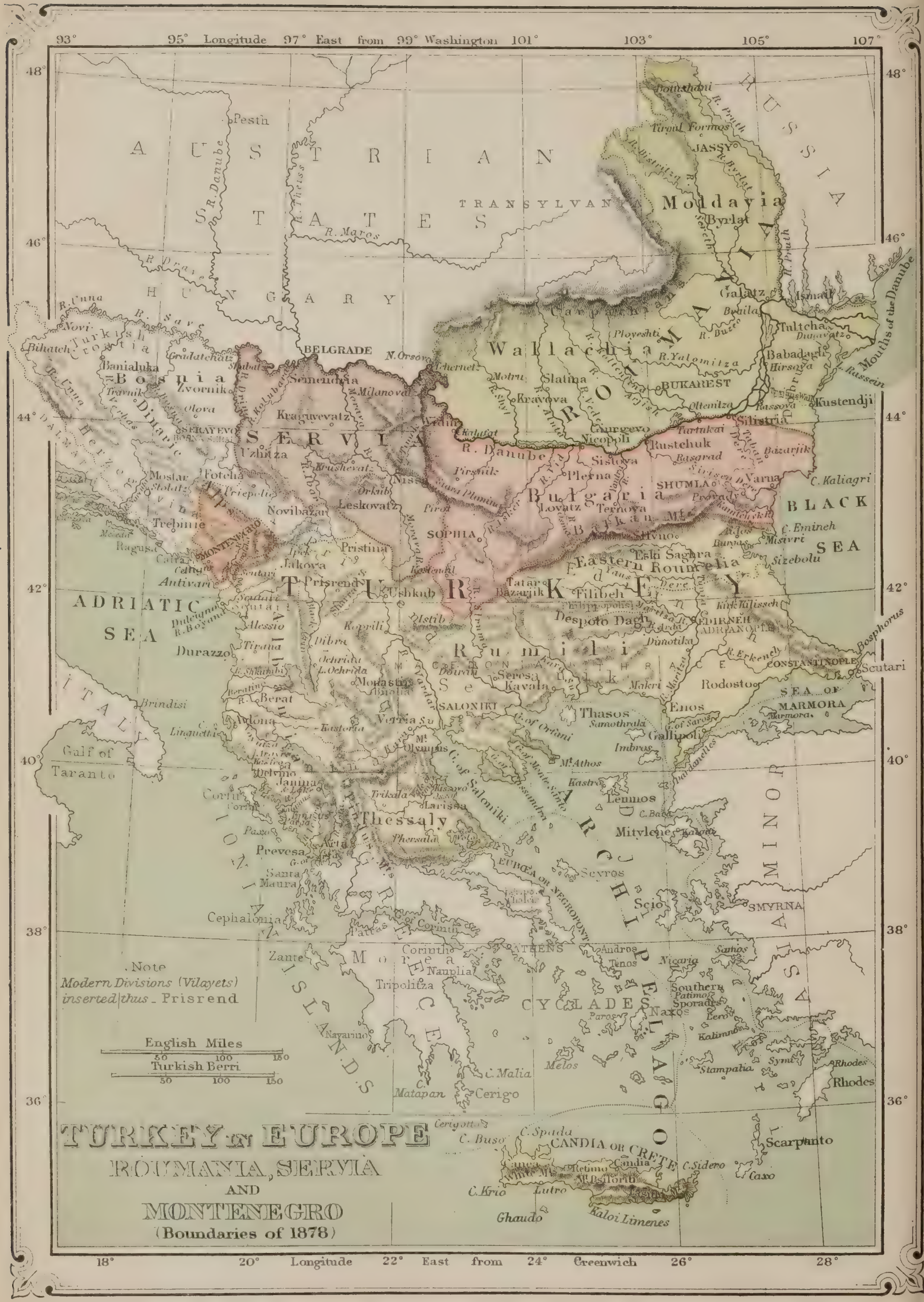
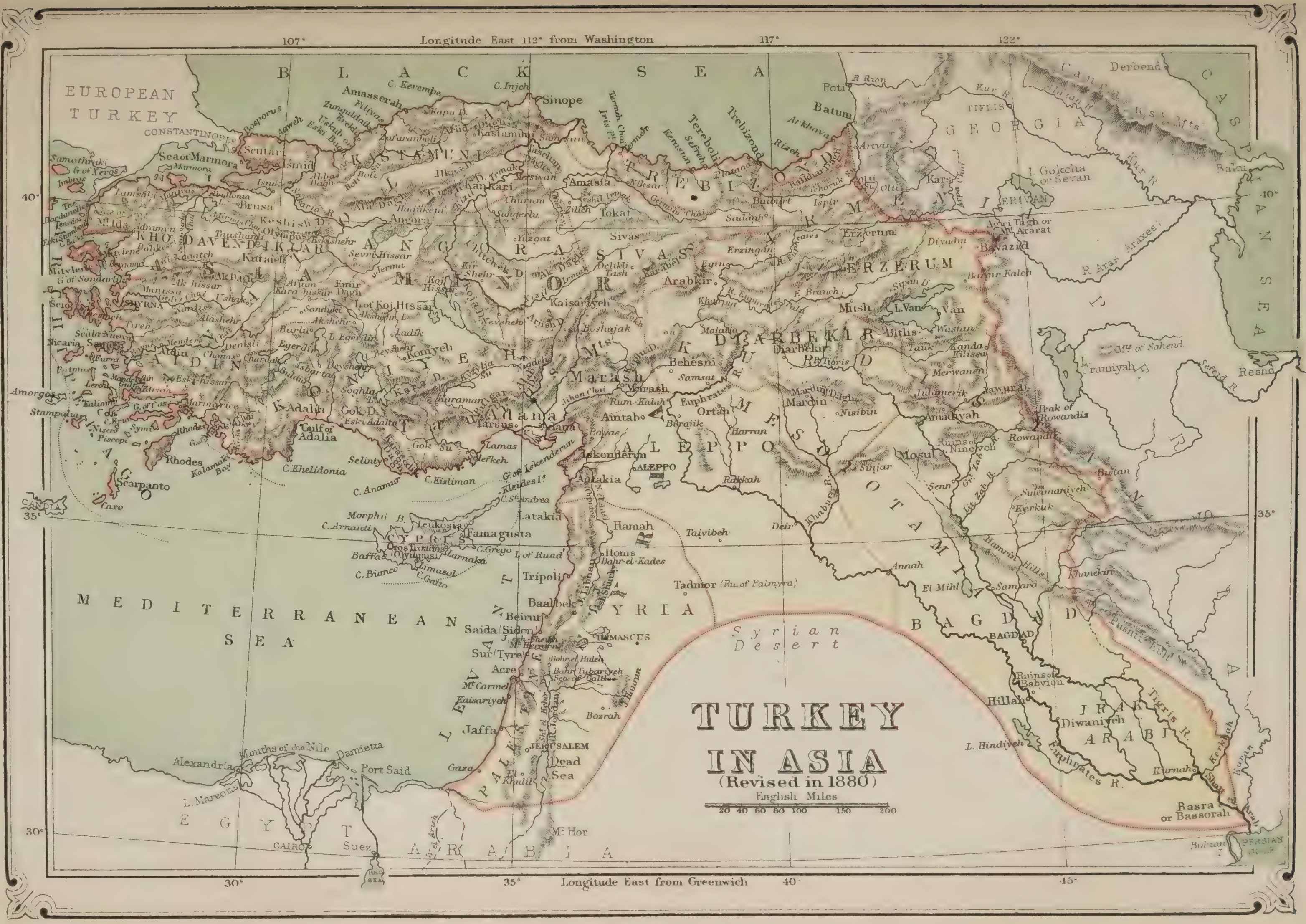


TURKEY IN EUROPE
ROUMANIA, SERVIA
AND
MONTENEGRO
(Boundaries of 1878)

domestic bird, contrary to the usual rule, has degenerated in size, flavor, and beauty. The flesh of the wild turkey is more pheasant-like than that of the domesticated varieties. The old males keep by themselves, as do the females and young, the former being apt to destroy the eggs in order to prolong the honeymoon; they are polygamous, the males in the breeding season, in March, strutting before the females, with tail spread and elevated, wings drooping, feathers ruffled, head and neck drawn back, emitting a puffing sound; the males also utter singular notes, resembling the word "gobble" several times repeated; they fight desperately for the possession of the females. The nest is a slight hollow in the ground filled with withered leaves, in a dry and sheltered situation, and usually contains, when full, 10 to 15 eggs; after this time the males conceal themselves while recovering their condition; the females alone incubate, carefully concealing the nest, approaching it with great caution and always in a different way, covering the eggs with dry leaves when going in search of food, and bravely defending them against depredators; sometimes three or four females lay in one nest, one remaining to guard it while the others seek for food. The males are attentive to the young, which run as soon as hatched, but are very tender and easily killed by cold and wet. Turkeys run very fast, and when pursued trust more to their legs than to their wings for escape; they are generally shot from their roosts at night, or entrapped in a pen or enclosure into which they are enticed by grain; their feathers are employed by the Indians in ornamental work; their greatest enemies are lynxes and owls, and other carnivorous mammals and birds.—Two other species of turkey, the *M. ocellata* (Cuv.) and *M. Mexicana* (Gould), have been described as inhabiting Central America, Mexico, and the table lands of the Rocky mountains, both closely resembling in plumage and habits the common wild species.—The progenitor of the present race of domesticated turkeys is not known with certainty; some naturalists incline to the belief that it is the *M. gallopavo*, while others consider it to be an allied species, perhaps now extinct. Domesticated turkeys thrive best on high, dry, and sandy soil, and when grasshoppers are plentiful can pick up their own living; in temperate climates they generally lay twice a year, 15 eggs or less, white with small spots of reddish yellow. One male will suffice for 12 to 15 females, the latter being prolific for about five years, though those of two or three years are the best hatchers; incubation lasts 27 or 28 days, and they are such close sitters that food must be placed within their reach; when they are raised on a large scale they are made to hatch in darkened places, and so that the turkey pouts, or young turkeys, shall all come out together; the young require warmth, proper food, and pure water, and must be protected against rain and the hot sun; they are liable at all ages to many diseases, for the treatment of which special works in abundance can be consulted.—Several fossil turkeys have been described by Professors Cope and Marsh in the post-tertiary.

TURKEY, or The Ottoman Empire (Turk. *Osmanli Vilayeti*), a country extending over parts of southeastern Europe, western Asia, and northern Africa. It consists of the absolute possessions of the sultan (Turkey proper) and of his dependencies, the latter embracing the tributary states of Roumania, Servia, Samos, and Egypt, and the nominal dependencies Tripoli, Tunis, and Montenegro. Turkey proper, usually divided into Turkey in Europe (situated between lat. 34° 45′ and 45° 30′ N., and lon. 15° 40′ and 29° 40′ E.) and Turkey in Asia (between lat. 12° 40′ and 42° 5′ N., and lon. 24° 50′ and 51° E.), borders on Austria, Servia, Roumania, European Russia, the Black sea, Russia in Asia, Persia, the Persian gulf, Arabia, the Red sea, Egypt, the Mediterranean, the Archipelago, Greece, the Ionian sea, the Adriatic, and Montenegro. Its political divisions (mostly vilayets) in Europe are the metropolitan district of Constantinople, Edirneh or Adrianople (Roumelia or Thrace), the principality of Tuna or the Danube (Bulgaria), Salonica (Macedonia), Janina (Thessaly and Albania), Prisrend (Albania), Scutari (formerly part of Prisrend), Bosnia (including Turkish Croatia), Herzegovina (until lately part of Bosnia), and Candia or Crete. The divisions of Turkey proper in Asia are the Asiatic portion of the metropolitan district, Khodavendighiar or Brusa, Aidin, Konieh, Angora, Kastamuni, Trebizond, Sivas, and Adana, all in Asia Minor; Erzerum (Armenia), Diarbekir (Kurdistan), Bagdad (Irak Arabi), Aleppo (N. Syria), Sur or Syria (central Syria, Phœnicia, and Palestine), Hedjaz and Yemen (in W. Arabia), Hedjer (in E. Arabia), and the islands of the White sea (Archipelago). The aggregate area of Turkey proper in Europe is about 140,000 sq. m., and in Asia 760,000 sq. m. The population of the former is about 8,500,000, and of the latter 13,200,000. The aggregate area of the dependencies is estimated at about 1,300,000 sq. m., and their aggregate population at about 26,000,000; but all statistics relating to Turkey are necessarily imperfect in the absence of regular official returns. The most important cities in Turkey proper, besides Constantinople, the capital, are Adrianople and Salonica in Europe, and Smyrna, Damascus, Bagdad, Beyrout, Aleppo, Brusa, Erzerum, and Trebizond, in Asia.—The coasts of Turkey proper are washed by the Black sea, the Bosporus, the sea of Marmora, the Dardanelles, the Archipelago, the Mediterranean, the Ionian sea, the Adriatic, the Red sea, and the Persian gulf. This vast extent of coast embraces many excellent harbors. It is indented by numerous gulfs and bays, of which some of the principal are the gulfs of Avlona, Arta, and Salonica, in Europe; Adramyti, Smyrna, Adalia, and Iskanderun, in Asia. Large salt lakes abound, chiefly in Asiatic Turkey, the most remarkable being the Dead sea in Palestine and Lake Van in Armenia. The rivers of Turkey in Europe may be classed under three heads: those flowing respectively into the Adriatic and Ionian seas, into the Archipelago, and into the Black sea. The first class are usually small, rising near the coast range of mountains; the Narenta, Drin, and Voyutza are the principal. To the second class belong the Salembria, Vardar, Struma, Kara-su, and Maritza; to the third, the Danube with its tributaries and a few small rivers. The rivers of Asiatic Turkey include those flowing into the Black sea, the Archipelago, the Mediterranean, the Red sea, and the Persian gulf, and the Jordan, which empties into the Dead sea. The principal rivers flowing into the Black sea are the Tchoruk, Yeshil Irmak, Kizil Irmak, and Sakaria. Those discharging into the Archipelago or the Mediterranean are small, but of historical interest, as the Menderes (Mæander), Tersus (Cydnus), Aasy (Orontes), and Litany (Leontes). The streams falling into the Red sea are insignificant, but among those flowing into the Persian gulf are the Euphrates and Tigris with their numerous tributaries. Turkey proper includes Thasos, Scio (Chios), Samos, and other islands of the Archipelago and sea of Marmora, as well as Candia, Rhodes, and Cyprus.—The two principal mountain ranges in European Turkey proper, which form the great watersheds between the different basins of the country, are: 1. The Illyrico-Hellenic or western range, comprising the Dinaric Alps, a continuation of the Julian Alps, which separate the Adriatic coast from the basin of the Save, and the Pindic chain, connected on the north with the preceding, separating Albania from Macedonia and Thessaly, uniting with the Olympian chain on the south, and forming the watershed between the Ionian and Ægean seas; Mt. Ida in Candia is considered an isolated branch of the southern continuation of this chain. 2. The Balkan or Hæmus range, branching off from the preceding N. E. of Albania, dividing Macedonia and Thrace from Bulgaria, and terminating in Cape Emineh on the Black sea. Its most important branch is the Despoto Dagh. (See BALKAN.) Others connect it with the S. E. Carpathians, which separate the tributary state of Roumania from the Austro-Hungarian monarchy. The mountain system of Asiatic Turkey is composed of the Taurus and Anti-Taurus ranges and their Armenian continuations, which form the connecting link between the Balkan system and the mountain systems of Syria, Caucasia, and Persia; and the Syrian range, extending southward from the Taurus, culminating in the Lebanon mountains, and terminating in the Sinaitic peninsula, on the shore of the Red sea.—The surface of European Turkey is undulating or mountainous, but with a large proportion of arable land of moderate elevation. Much of Asiatic Turkey consists of elevated plateaus, many of them scantily watered, while other regions once very fertile are now covered by the sands of the desert. The plains, which embrace the once wonderfully fertile tracts of Babylonia and almost all Mesopotamia, generally suffer from want of irrigation; and though the slopes of the mountains afford good pasturage, the raids of Bedouins and Kurds diminish the production. In European Turkey about 40 per cent. of the area is arable and vine land, 6 per cent. meadows, 11 per cent. grass land, 14 per cent. forests, and 29 per cent. unproductive soil. Turkey in Europe is subject to violent climatic changes. Owing to the elevation of considerable portions and to the cold N. E. winds from the interior of Russia, the winter is in many parts excessively cold. Albania, being sheltered from the N. E. winds by mountains, has a more uniform climate, but is subject to scorching heats, protracted droughts, and earthquakes. In Asiatic Turkey (outside the Arabian districts), the winter is cold and humid in the mountainous regions, but in the sheltered valleys and plains it is warm and delightful. The summer heats are excessive, especially in Asia Minor and Syria. The valley of the Jordan and the regions of the Euphrates and Tigris are intolerably hot and dry in summer. Little or no rain falls from April to the middle of September, but the night dews are heavy. The peaks of Mt. Ararat and of the higher summits of the Lebanon and Taurus ranges are covered with perpetual snow.—The principal mineral productions of European Turkey are iron in great abundance, argentiferous galena, copper, sulphur, salt, and alum. In Asiatic Turkey, there are copper, lead, alum, silver, emery, and rock salt, in Armenia; in Asia Minor, all these and considerable quantities of nitre; in Syria, iron and coal, and west of the Jordan indurated chalk. Much emery is produced, and exported from Smyrna, but the mineral resources of Asiatic Turkey are in general undeveloped.—The chief botanical characteristic of both European and Asiatic Turkey is the predominance of the *labiatæ*, *caryophyllaceæ*, and *ericaceæ* or heaths, of coniferous evergreens, and of the amentaceous trees common to the south of Europe. In the basin of the Danube the pine, beech, oak, lime, and ash are the principal forest trees, and the apple, pear, cherry, and apricot the most common fruit trees. In the provinces S. of the Balkan these trees are only found on the slopes of the mountains, while on the lower lands the palm, maple, almond, sycamore, walnut, chestnut, and carob trees, and the box, myrtle, laurel, and other evergreens, are found; in Bosnia are large forests of fir and pine; the maritime plains of Albania are favorable to the growth of the olive, orange, citron, vine, peach, plum, and other fruit trees; and the plain of Adrianople and most of the region S. of the Balkan abound in roses, from which the attar is largely distilled. Maize is cultiva-



TURKEY IN ASIA
(Revised in 1880)

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ted in the south, rice, cotton, rye, and barley in the central provinces, and wheat, barley, and millet in the north. Though producing forest trees of the same families with those of European Turkey, the predominant trees of Asiatic Turkey are of different genera. The cedar, cypress, and evergreen oak crown the lower summits and thrive on the slopes of the Lebanon and Taurus; the sycamore and mulberry occupy the lower hills, and the olive, fig, citron, orange, pomegranate, and vine flourish luxuriantly in the lowlands. Mesopotamia abounds in dates, and in wheat, barley, rice, maize, tobacco, hemp, flax, and cotton.—Among wild animals of European Turkey are the wild boar, bear, badger, marten, wolf, wild dog, fox, civet, wild cat, bat, squirrel, beaver, hedgehog, mole, hare, fallow deer, roe, and chamois. Of birds there are over 250 species, including about 100 songsters. Game is plentiful, especially in the mountains. Fish are numerous, embracing all the known species of the Mediterranean; tunny, coral, and sponge fisheries are extensive; trout and other fish abound in the rivers, and leeches in the marshes. In Asiatic Turkey, the lion is still found E. of the Euphrates; the striped hyæna, lynx, panther, wild boar, and wild ass occur in Mesopotamia; the bear, wolf, wild hog, and jackal in Asia Minor; the leopard, hedgehog, jerboa, wolf, hare, and mole throughout Syria; and the Syrian bear on Mt. Lebanon. The camel, horses of the best breeds, the ass, ox, sheep, and goats, including the celebrated Angora species, are numerous. There are few countries for which nature has done as much as for Turkey; few in which the resources are so little developed; and, considering that the territories of the empire embrace those of ancient Assyria, Babylonia, Palestine, Phœnicia, Lydia, Ionia, &c., hardly any in which successive wars and misrule have destroyed so much of the results of former activity, wealth, and magnificence. For fuller descriptions see the articles on the separate parts of the empire (Albania, Armenia, Asia Minor, Bosnia, Bulgaria, Candia, Cyprus, &c.), and on its principal mountain ranges, rivers, and cities.—The races of Turkey are divided approximately as follows:

RACES.	In Europe.	In Asia.
Turks proper or Osmanlis	2,200,000	8,620,000
Turkomans, chiefly in N. Mesopotamia	....	100,000
Greeks	1,000,000	1,000,000
Armenians	60.000	2,000,000
Slavs (half Bulgarians, half Serbs)	3,550 000	....
Roumans or Wallachs	200.000	....
Albanians or Arnauts	1,200,000	....
Arabs	....	1,000,000
Syrians and Chaldeans	....	200,000
Druses	....	80,000
Kurds	....	100,000
Gypsies	200.000	....
Jews	70,000	80,000
Tartars	20,000	20,000
Total	8,500,000	13,200,000

The state religion is Mohammedan, and the alleged sayings and opinions of the prophet, and the decisions of his immediate successors comprised in the code of laws (*Multeka*), are binding upon the sultan. The laws and regulations (*Kannon Nameh*) established in the 16th century by Solyman the Magnificent constituted for a long period the basis of the administration of government and justice, and are still revered. But the Koran alone is the supreme authority in religion, law, and all spheres of government and life. It allows four wives, in addition to whom the sultan and other persons of rank and wealth may have unlimited numbers of concubines and female attendants or slaves. The masses of the poor can hardly support more than one wife, and even among the higher classes polygamy does not generally prevail. The rigid confinement of the females in the harem is in accordance with the Koran, which enjoins seclusion and modesty, and the veiling of the face. The ladies of the higher classes are averse to these restrictions, and are lightly veiled; but the masses of the orthodox Turkish women, especially in the interior, wear thick veils and reveal only the eyes. The Turks proper or Osmanlis, the Turkomans, Arabs, and Tartars are wholly, and the Kurds mostly Mohammedans; and a small portion of the Slavic race are of the same religion. The Mohammedans constitute a vast majority in Asiatic Turkey, but are a minority in every European vilayet except Prisrend and Scutari and the metropolitan district. The sultan is regarded as the successor of the prophet, and on that account as the head of all believers. Even rulers of remote Mohammedan communities have at various times recognized the sultan as the chief of all Mussulmans and invoked his protection. As the Koran constitutes both a code of law, of religion, and of ethics, there is a close connection between the ministers of religion and the interpreters of jurisprudence (muftis, mollahs, &c.). Together these form the body of the ulema (see ULEMA), governed by the sheikh ul-Islam, the only dignitary who holds office for life. The Christians of Turkey belong mostly to the Greek church, including about 6,000,000 members, mostly subject to the patriarch of Constantinople. The Armenian church is confined to the Armenian race. The head of the Gregorian Armenians is the patriarch in the Turkish capital, who ranks below the catholicos in Russian Armenia, but is otherwise entirely independent of him. A portion of the Greeks and Armenians, Nestorians, and Jacobites have united with the Roman Catholic church, but keep up separate organizations as united Greeks, united Bulgarians, united Armenians, Chaldeans, united Syrians, and Maronites. The number of Roman Catholics, inclusive of the members of the oriental churches who recognize the supremacy of the pope, is estimated at about 300,000 in European and from 300,000 to 400,000 in Asiatic Turkey. All these denominations, as well as the Protestants (whose converts are chiefly won from the Armenians by American missionaries) and the Jews, are recognized by the sultan as independent religious communities, with the privilege of maintaining their own ecclesiastical organizations. Among the numerous peculiar sects are the Druses and Ansaries in Syria. The antagonism between the various religious bodies is stronger in Turkey than anywhere else, and they are far from observing toward each other the tolerance which is granted to them by the government. A new educational law promulgated in 1869 provided for the establishment of elementary schools for both sexes in every commune, of schools of a higher grade and gymnasiums or colleges in larger towns, of industrial and normal schools, and of a university, after German models, which was opened in Constantinople in February, 1870. There have since been established there a school of law, a military school, one for engineers, and one of artillery, and a naval school on the island of Khalki in the sea of Marmora. The government has declared its intention to make the schools more and more national, and to abolish the old Arabian system of instruction. Outside of the capital the progress of education is slow, chiefly owing to the innate aversion of the Turkish mind for mental effort. The government, however, seeks to promote national literature, and recently passed a copyright law. The Christian communities strive to emulate European systems of education, especially the Greeks and the Protestants, and there are several good Catholic schools; but the most efficient institutions are the Robert college (American) at Constantinople, the new Protestant college at Beyrout, and the schools of the Prussian deaconesses in various places. —The empire abounds in archæological treasures. The most important results have been achieved in the present century by the excavations in Assyria, Asia Minor, Palestine, and Cyprus.—Turkey contains a number of foreign (called Frank) or extra-territorial communities, placed under the protection of resident diplomatic and consular agents. They originated in the Levant trading companies, many of the early English, French, Italian, German, and other settlers and adventurers becoming permanent residents; and their numbers have been greatly increased by the rapid progress of European monopolies in railways, finance, trade, and industry, and in all Turkish enterprises. The representation of foreign powers in Turkey dates from the 16th century, and has been protected by the so-called "capitulations" and subsequent treaty stipulations, affording full safety to diplomatic and consular officers, and vesting them with judicial powers and every right necessary to the interests of their constituencies. These include the richest Greek and English merchants, whose influence is almost boundless through their ambassadors and consuls. The native Christian subjects are called rayahs, and, whether Greeks or Slavs, chiefly belong to the Greek church, of the principal branch of which the czar is the supreme head, whence results the great influence of Russia. The social equality which prevails among the Mussulmans enables persons of the lowest condition to rise to the highest; but the rayahs have had no such opportunities, and, in addition to their hard struggles for subsistence, they have borne the brunt of Moslem fanaticism since the conquest of Constantinople, when the most influential Greeks (Fanariotes) made themselves serviceable to their conquerors, while the masses of the Christians were regarded as outlaws. Shut out from all contact with European civilization, they lost their mental energy and ambition, and became infected with Asiatic vices without acquiring the redeeming qualities of independence possessed by their conquerors, toward whom their outward obsequiousness and secret hatred increased in the measure of their helplessness and demoralization. The church became, under these circumstances, not only the idol of their faith, but also the only hope of their ultimate redemption through the influence of Christian nations. This abnormal condition of the rayah populations has more than once called for the intervention of foreign powers, while remaining a chronic source of disaffection and disturbance. The successive concessions which they received during the present century, under the pressure of disastrous events, have not materially lessened their burdens, although they now apparently enjoy equality before the law under the jurisdiction of mixed courts. They are also exceptionally admitted to official positions, and the latest decrees of the sultan remove all previous disabilities in this regard. But the Mohammedans respect no laws excepting those sanctioned by the Koran, and the officers charged with the execution of imperial decrees are generally opposed to the boons they are intended to confer on Christians. Many of the Turkish officeholders are also notorious for venality and incapacity, especially in remote provinces, beyond the immediate control of the vigilant foreign ambassadors at the capital. The Armenian rayahs have greater ethnological affinities with the Turks than the Greeks and Slavs. Many of them prosper in official positions in the capital, and as dragomans of foreign embassies, for which they are specially qualified by their adroitness in managing the pashas and their linguistic attainments. They are also clever financiers, and in that department eclipse both Greeks and Jews. But in Armenia proper their condition is made so deplorable by the Turkish officials and by the fearful ravages of the Kurds, that hundreds of Armenians have lately embraced Mohammedanism as the only alternative against these persecutions. The great Greek merchants are not rayahs, but protected foreigners. The Jews are mostly poor. They are descendants of refugees from Spanish persecution, retain a Spanish dialect, and are obliged to wear a distinctive costume, excepting a few whose wealth secures them special privileges. They are despised by the Turks and periodically persecuted by the Greeks. The Turks fully respect only foreigners invested with official rank or with powerful protection. In the absence of such prestige, the slightest provocation is apt to reveal their innate prejudices against the *giaour*, though, when not under the influence of fanatical or criminal passion, they are remarkable for their dignity and courtesy, and for honesty in their private relations.—The Turkish government, or Sublime Porte, is an absolute monarchy, the rule of which is vested in a sultan (officially called *padishah*, supreme ruler) of the dynasty of Othman. The sultan is allowed to govern in the most arbitrary manner, except in matters of religion and law, which require the concurrence of the sheikh ul-Islam (grand mufti). The succession to the throne has from the first been vested in the oldest surviving male member of the ruling family. The late sultan, Abdul-Aziz, wished to secure the throne to his eldest son Yusuf, making the succession direct from father to son, a change which was established in Egypt in 1866; but he encountered an invincible opposition to any deviation from the ancient rule, and was succeeded by the heir apparent, his nephew Mehemet Murad (born in 1840), the eldest son of the sultan Abdul-Medjid. Former sultans have frequently secured the succession to their sons by putting to death immediately on their accession all their other male relatives. The civil list of Abdul-Aziz was raised from £900,000 in 1868 to £1,200,000 in 1873, and he annually received besides £500,000 for pensions and charities, derived an additional revenue from crown domains and from presents, and might at his pleasure raise unlimited amounts. His actual annual expenditure was estimated at £4,500,000. This extravagance in the midst of national insolvency and peril shook even the loyalty of the orthodox Moslem, especially as the people were everywhere ground down by tithes and by the rapacity of tax-gatherers and other officials.—The empire is divided into vilayets, under governors general (*valis*). They are subdivided into sanjaks (districts) under governors (*mutessarifs*), and these into cazas (circles) under lieutenant governors (*kaimakams*), and the latter into nahiyes (communes). The mayors of villages are called *mukhtars*. The former eyalets or pashalics have been united or changed into vilayets. The provincial governors, who generally hold the rank of pasha, formerly had the right of sentencing persons to death; this has been withdrawn, but they still rule arbitrarily, particularly in remote districts, and are frequently in collision with the rayahs and the protected foreigners. Even after their proven dishonesty or unfitness, they are generally not dismissed from the service, but only transferred to a less important office. New territorial divisions are often created merely in order to make places for influential pashas.—The grand vizier presides over the council of ministers. This comprises the grand vizier's councillor, who acts as minister of the interior, the president of the supreme council of justice, who acts as minister of justice, and the ministers of foreign affairs, war, finance, navy, commerce, police, public works and quarantines, education, and archives, the superintendent of mosque property, and the president of the council of state established in 1868. The department of taxes, the united postal and telegraph services, and the mining department are respectively in charge of directors general. The ministerial council corresponds to the European cabinets, while the new council of state is intended for the preliminary discussion of new laws and public measures. This body comprises an executive department, and four others, devoted to finance, justice, education, and commerce, and consists of 50 Mohammedan and Christian members chosen by the sultan. A scheme for the reorganization of the police and of the collectors of taxes, the latter to supersede the policemen (*zaptiehs*), was in 1876 in process of adoption. In 1868 a supreme court for civil and criminal cases was substituted for the former grand council of justice, and the office of attorney general was created early in 1876. There are courts of appeal in the capital of each vilayet, and various superior tribunals exist all over the country, about 100 subordinate tribunals, and mixed courts for settling cases between Mohammedans and non-Mohammedans, besides the consular courts. This divided jurisdiction naturally results in complications. The ancient "capitulations" relating to foreign jurisdiction were recently abolished in Egypt as altogether obsolete, and they have been modified in Turkey proper, but without satisfactorily settling the questions at issue. Among the treaties with foreign nations now in force are extradition and reciprocal naturalization treaties recently concluded with the United States.—The crown lands (*miri*) include the larger portion of the soil. They are granted on lease, and forfeited if the cultivation is neglected for three years. The land appropriated to mosques and for other religious purposes, to schools, and to charitable institutions, consists of real estate originally granted by the crown (*vakuf el-zarai*), and of private legacies for the same purposes (*vakuf el-karamain*). The grants of land (*malikaneh*) originally made for military purposes and for the pilgrimages to Mecca are hereditary and free from tithes. The fourth and least considerable form of tenure is freehold property (*mulkh*), chiefly consisting of city estates and of land adjoining villages. Foreigners can now hold real estate in their own names, on the same terms as natives. The great Turkish landed proprietors are far more independent of the government than the landed aristocracy of Great Britain and continental Europe; the most ancient and powerful of them in Aidin, Brusa, and other parts of the empire, resemble feudal princes, but generally keep aloof from public affairs, and are distinguished for munificence and charity. Some of the Armenians also are vast landholders, and they as well as some of the Greek and other merchants have city and country palaces which vie in magnificence with those of the foreign ambassadors, of the great pashas, and of the imperial and Egyptian dynasties. The principal charter of civil rights, next to the *hatti-sherif* of 1839, was the *hatti-humayun* of 1856, which, as well as subsequent and quite recent pledges, promised great improvement and reforms, but have not produced permanent ameliorations, the orthodox Moslems being opposed to increased privileges for the Christians, while the latter insist upon much greater ones than the sultan is willing to concede.—The financial budget for the year 1875–'6, ending in March, estimates the revenue at $125,500,000, and the expenditures at $103,800,000. As usual, it is made to show a surplus, when in reality there is an immense deficit. The public debt of Turkey is divided into two classes, the foreign or hypothecated debts, contracted abroad and secured on special sources of revenue, and the internal debts, known under a variety of names, issued at Constantinople alone, and therefore dependent only on a compact between the Porte and its subjects, and secured on the general credit and resources of the empire. The nominal amount of the foreign debts had reached in January, 1874, the sum of $772,000,000, and the floating debt was estimated at $64,600,000. A new loan was issued in September, 1874, to consolidate the floating debt, which since January of that year had again largely increased. A financial report from Constantinople, dated May 10, 1875, estimated the entire Turkish debt at $969,600,000. On Oct. 8, 1875, the government declared its partial insolvency, and promised to pay half of the interest due on the foreign debt in cash, and the rest in new bonds to be issued to the extent of about $166,000,000. A reorganization of the army was begun in 1871, and is to be completed in 1878. According to the new regulations, the military forces (formerly divided into *nizam*, or active army, *idatyal*, first reserve, *redif*, second reserve, and *hiyade*, militia) are divided into the regular army, the reserve, and the sedentary army. In time of war the army is to contain 700,000 men, of whom 150,000 will belong to the regular army, 70,000 to the first reserve, and the remainder to the sedentary army. The annual contingent will be nearly 40,000 men. The imperial guard at Constantinople is the only thoroughly efficient military body in the empire. Non-Mussulmans are not liable to service in the army, but have to pay a military exemption tax, known as the *bedel*. Polish, Hungarian, French, English, German, and other foreigners are employed in the Turkish army and navy, some of them reaching high positions, such as the late Austrian Omer Pasha as commander in the former, and the English Hobart Pasha as admiral in the latter service. The navy consisted in 1874 of 20 iron-clad vessels and 99 transports, and was manned by 34,000 sailors and marines. The crews are raised in the same manner as the land forces.—The arrivals and departures in the Turkish ports in 1873 comprised 43,200 foreign vessels, tonnage 12,738,000, and 29,614 Ottoman vessels, tonnage 3,518,000, besides 178,143 small craft, mainly Turkish, engaged in the coasting trade, tonnage 1,903,000. The arrivals in 1874 at Constantinople, the chief port, comprised altogether 4,185 steamers (2,042 English) and 16,489 sailing ships (2,500 Greek and the rest chiefly Ottoman), with an aggregate tonnage of 4,606,200, or one fourth of the whole national trade. Much shipping business is carried on at Smyrna, Salonica, and Trebizond. Adrianople, Aleppo, Damascus, and Bagdad are the most prominent interior commercial centres of the empire. The imports consist chiefly of British and other manufactures and colonial goods, and the chief exports comprise grain, cotton, fruit, wine, tobacco, coffee, honey and wax, silk, emery, carpets, and madder. The average annual estimated value of imports into European Turkey in 1868–'70 was about $90,000,000, and of exports $50,000,000; there are no trustworthy later data, and none at all in regard to Asiatic Turkey. The exports to England in 1874 amounted to £6,000,000, and the imports from that country to £7,000,000; the exports to Russia, about 20,000,000 rubles, and the imports 6,000,000 rubles. The imports from the United States amounted, in the year ending June 30, 1874, to $2,559,551, and the exports to $786,877.—With the exception of a few great thoroughfares, there are no roads worthy of the name throughout the empire. The first railway dates from 1862. The principal railways (1876) are those from Constantinople to Adrianople, Varna to Rustchuk, Kustendji to Tchernavoda, Salonica to Mitrovitza, and Novi to Banialuka, in Europe, and from Smyrna to Ephesus, Aidin, and Alashehr, and Scutari to Ismid, in Asia Minor. According to a convention with Austria, Sept. 30, 1875, the Belovar-Sofia line was to be completed in 1876, and its extension to Nissa and connection with Belgrade in 1879. The aggregate length of railroads finished in European Turkey is nearly 1,000 m.; in Asiatic, not much more than 100 m. The Danube with its navigable tributaries forms the great channel of commerce for the northern portions of Turkey in Europe. The lines of telegraph have an aggregate length of 17,364 m., and the wires of 28,973 m. There were 400 telegraph offices. The communications with the interior were of the most inefficient description until March 1, 1876, when the entire postal service of the empire was for the first time undertaken by the government, which proposes to organize it after the best European models.—The Ottoman empire, including its dependencies, almost closely corresponds to the Byzantine empire in the times of its greatest extent. It arose when the latter had been stripped by Saracen and Seljuk conquest of all its possessions in Asia and Africa, excepting some territories in the north and west of Asia Minor. It derives its name from Othman or Osman, the successor to the power of the Seljuk sultans of Iconium or Roum, who conquered Nicæa in Bithynia (1299) and several neighboring districts. (See SELJUKS, OTHMAN, and TURKS.) The Ottoman power was increased by his son Orkhan's capture of Brusa, the Bithynian capital (1326), and by his invasion of Thrace. Othman's grandson Amurath I. took Adrianople in 1361, regularly organized the janizaries (see JANIZARIES), vanquished the princes of Bulgaria and Servia, and was killed at the moment of his signal victory over the Serbs at Kosovo in 1389. His son Bajazet I. invaded Wallachia and Hungary, besieged Constantinople for several years and then retreated, defeated Sigismund of Hungary at Nicopolis (1396), and overran the Morea; but having previously completed the conquest of Asia Minor, he was obliged to evacuate Greece and to protect the former region against the invasion of Tamerlane, by whom he was finally defeated and captured in 1402, a year before his death. His grandson Amurath II. (1421–'51), son of Mohammed I., conquered Thessalonica and Janina. He was defeated by Hunyady at Belgrade in 1439, and on subsequent occasions, but in 1444 achieved a great victory over Hunyady and King Ladislas of Poland and Hungary at Varna. He overwhelmed the Hungarians in a second battle at Kosovo, three years before his death. His son Mohammed II. (1451–'81) gave the final death blow to the Byzantine empire by his conquest of Constantinople, after a memorable siege of 53 days, May 29, 1453; and in 1454 he completed the conquest of Servia. At Belgrade he was repulsed by Hunyady (1456), but he subdued most of the Morea (1460), and soon afterward Trebizond, Wallachia, and almost all the islands of the archipelago. He was repeatedly defeated by Scanderbeg in Albania, and subjugated that country only after the latter's death (1467). Mohammed was the founder of the greatness of Turkey, and was surnamed the Conqueror. Remarkable among his successors was Selim I. (1512–'20), son of Bajazet II., who extended his dominion over Mesopotamia, Assyria, Syria, and Egypt, and established a regular Ottoman navy. His son Solyman II., the Magnificent, took Belgrade in 1521 and Rhodes in 1522, defeated the Hungarians at Mohács in 1526, captured Buda in 1529, and marched on Vienna, where he was repulsed with great loss, and again in 1532. Subsequently he conquered Armenia, Croatia, Yemen, Shirvan, and Georgia; but his naval forces, which had extended his sway over the Barbary coast, were defeated at Malta in 1565, and in 1566 he was repeatedly repulsed by Zrinyi at Sziget, and died a few days before the last and fatal assault on that Hungarian fortress. The reign of Solyman marks the zenith of the military power of Turkey, which began to decline after his death, his son Selim II. being the first of the sultans who did not command the troops, and who led the life of a voluptuary. After conquering Cyprus, he lost in 1571 the great naval battle of Lepanto. He was succeeded by a series of still more inefficient rulers, under whom the janizaries became omnipotent despite the decline of their military organization, and murders and conspiracies in the seraglio and revolts of pashas in remote provinces more and more frequent. The more important of these sultans were Amurath III. and IV., Mohammed IV. (who conquered Candia after a protracted struggle), and Mahmoud I., accounts of whose reigns are given under their own names. Frequent wars with Poland, Austria, Persia, Venice, and Russia were waged, but rarely with success. Montecuculi, Sobieski (who routed Mohammed IV.'s army before Vienna in 1683), Louis of Baden, and Prince Eugene destroyed the Turkish power on the Danube; and at the peace of Carlovitz in 1699 Mustapha II. surrendered nearly all his Hungarian possessions to Austria, Azov to Peter the Great of Russia, Podolia and Ukraine to Poland, and the Morea to Venice. During almost the whole of the 18th century Turkey was at war with Russia, and much of the time with Austria also. Though occasionally successful, as in the reconquest of the Morea under Ahmed III. (1715), this protracted warfare was disastrous to Turkey, and she lost the Crimea and all her possessions N. of the Black sea, and the exclusive navigation of that sea and the straits connected with it. In other quarters, too, losses were suffered. Selim III. (1789–1807) was an enlightened ruler, but could not avert continuous disasters. The peace concluded with Russia at Jassy in 1792 made the Dniester the frontier between the two empires. Several provincial governors aspired to independence, and the conquest of Egypt by Bonaparte led to a war with France, which ended in considerable concessions to that power; and wars with Russia and England and the revolt of the janizaries aggravated the critical condition of the country. Servia rose under the leadership of Czerny George (1805), and subsequently achieved its semi-independence under Milosh Obrenovitch. Selim was deposed in 1807, and Mustapha IV. was placed on the throne chiefly through the influence of the janizaries, but was displaced and put to death in 1808 by his brother Mahmoud II., who after a terrible struggle finally disbanded that body in 1826, massacring thousands of them. In the mean time he had also displayed great energy in Albania by crushing Ali Pasha of Janina (1822), but the Greek revolution proved fatal; and as Mahmoud disregarded the European remonstrances against the cruelties perpetrated in Greece by Ibrahim

Pasha and others, the Turco-Egyptian fleet was destroyed by the English, French, and Russian squadrons at Navarino, Oct. 20, 1827. Hostilities virtually ceased in 1829. Greece achieved her independence, and after a victory by the Russians under Diebitsch, who had crossed the Balkan, the treaty of Adrianople, Sept. 14, 1829, restored peace between Russia and Turkey. In 1832 began the contest of the Porte with Mehemet Ali, the viceroy of Egypt. The sultan was repeatedly defeated, and the struggle was not ended at the time of his death (1839), and only a year after the accession of his son Abdul-Medjid, through the intervention of England and her allies in behalf of the Porte, whose admission into the political system of European states was for the first time officially conceded by the treaties of July 15, 1840, and July 14, 1841. The integrity of Turkey became a cardinal principle of European diplomacy, and was strengthened by the coalition of England, France, and Sardinia with Turkey in the Crimean war (1853–'5), which resulted in the discomfiture of Russia, and the neutralization of the Black sea by the treaty of Paris (1856). A French army and an English fleet again interfered in 1860 to terminate the conflict between the Druses and Maronites, after fearful massacres of Christians at Damascus and in the Lebanon, and great loss of life on both sides. The reign of Abdul-Medjid was also troubled by conflicts with Montenegro, and a rising in Herzegovina. He died June 25, 1861, and was succeeded by his brother Abdul-Aziz. In December of the same year the Danubian principalities were permanently united under the name of Roumania, and in 1866 Charles I. of the house of Hohenzollern was elected hereditary prince. A Cretan insurrection broke out in the same year, and led to serious collisions with Greece, which were finally terminated by a conference of the great powers at Paris, Jan. 9, 1869. In the mean time Servia had taken advantage of these complications to obtain (1867) the independence of all her fortresses; while Egypt, after coöperating with Turkey in Crete, made extravagant pretensions which would have resulted in war but for the influence of foreign powers. The Franco-German war (1870–'71) impaired the prestige of the Porte's steadiest ally, and enabled Russia to recover her former vantage ground in the East by insisting upon a modification of the treaty of Paris of 1856 (November, 1870), and its provisions which had neutralized the Black sea ports and other articles restricting Russia were abrogated by a conference in London, January, 1871. The grand vizier Aali Pasha died in the same year, and Fuad Pasha having died two years before, Abdul-Aziz was deprived of his most influential advisers. After vain attempts to check the ambition of Egypt, the sultan finally granted (June, 1873) important privileges to the present khedive, Ismail Pasha, making him almost an absolute ruler. In July, 1875, the Turkish port of Zeilah, in the gulf of Aden, was added to Egypt, bringing the entire African coast of the Red sea under her domination. In November the khedive transferred all his shares in the Suez canal to England, without apparently asking the consent of the Porte or any other government. In the summer of 1875 an insurrection broke out in Herzegovina, and in October Turkey declared her partial insolvency. Other grave complications threatening a dismemberment of the empire, the six powers who had signed the treaty of Paris of 1856 proposed a scheme of reforms in February, 1876, which the sultan mainly accepted; but the insurgents refused to lay down their arms, and his situation became more and more critical, and was greatly aggravated by the opposition of the Turkish fanatics to Christian equal rights, and the massacre of the French and German consuls at Salonica in May. A conference at Berlin between Russia, Austria, and Germany contemplated more exacting terms for the protection of the Christians and restoration of tranquillity, but England took no part in it. The adversaries of Abdul-Aziz, prominent among whom were the *softas*, comprising about 20,000 students in Constantinople, who were alienated by his alleged subserviency to Russia, his refusal to restore his spoils (which were afterward confiscated), and his attempted change of the order of succession, brought about his deposition on May 30, and the accession of his nephew as Amurath V., who on June 4 announced his predecessor's alleged suicide. The new sultan is beset by formidable financial and other difficulties. Herzegovina is still in revolt (June, 1876); Servia, Montenegro, and Bosnia maintain a threatening attitude; and Bulgaria and other provinces are disaffected. But the European powers, and especially England in her antagonism to Russia, strive to prevent the dismemberment of Turkey, although the general confidence in the stability of Ottoman domination over Christian communities has never since the conquest of Constantinople been so low as now.—See *Geschichte des osmanischen Reichs*, by Hammer-Purgstall (10 vols., Pesth, 1827–'34); "History of the Ottoman Empire," by E. Upham (2 vols., Edinburgh, 1829); *Geschichte des osmanischen Reichs in Europa*, by Zinkeisen (7 vols., Gotha, 1840–'63); *L'Asie Mineure*, by P. Tchihatcheff (8 vols., Paris, 1853–'69); "The Turkish Empire," by E. Joy Morris (Philadelphia, 1854); *Histoire de la Turquie*, by Lamartine (6 vols., Paris, 1854); "History of the Ottoman Turks," by E. S. Creasy (2 vols., London, 1854); *Geschichte der Türkei neuester Zeit*, by Rosen, (2 vols., Leipsic, 1866–'7); *Études historiques sur les populations chrétiennes de la Turquie d'Europe*, by Ubicini (Paris, 1867); "Modern Turkey," by J. Lewis Farley (London, 1872); and *Der Islam im neunzehnten Jahrhundert*, by Vámbéry (Leipsic, 1875).

TURKEY BUZZARD, the popular name of one of the common American vultures, *cathartes* (*rhinogryphus*) *aura* (Illig.). It is about 2½ ft. long and 6 ft. in extent of wings; the bill is long and comparatively slender, with an arched, strong tip; a large soft cere, two thirds the length of the bill, in which the pervious nostrils are placed; wings long and pointed, the third and fourth quills nearly equal and longest; tail moderate and nearly even; tarsi short, plumed below the knee, and with small scales; toes weak, united by a small membrane, hind one short and weak, and claws strong; head and neck naked, no fleshy crest, and the plumage black. All the vultures which have the nostrils horizontal and perforate, with a basal web between the middle and inner toes, belong to the new world. The color is brownish black, with a purplish lustre, darkest on the back and upper part of tail, and some pale edgings; bill yellowish; head and neck bright red, with a few scattered hair-like feathers and wrinkled skin; plumage commencing on the neck with a circular ruff of prominent feathers. It is found all over North America, except the arctic regions, going on the Pacific coast as far N. as the British possessions, but on the Atlantic rarely seen N. of New Jersey; but it is most abundant in the southern states, migrating thither from the colder parts. It is essentially a carrion eater, though it will devour any kind of fresh meat, and even small living mammals, birds, and reptiles; it has been known to attack and kill weak and sickly animals in the fields. It associates in flocks of 25 to 30, even when not feeding, becoming very familiar in the southern cities, where it devours any carrion or animal filth left in the streets. It finds out its prey at a great distance, and sails for miles without apparent effort, with the tips of the wings bent upward by the weight of the body; it is often seen in company with the black vulture, hawks, kites, and crows; it is also a good walker. Its average weight is 6½ lbs., which is somewhat less than that of the black vulture. It is fond of particular roosting places, generally high and dead cypresses in deep swamps; it is very sensitive to cold, and liable to disease about the eyes and legs in the shape of warts and excrescences; when alarmed or provoked it utters a loud hissing noise. In the southern states the breeding season begins early in February, the nest being usually placed in the hollow of a dead tree, or, it is said, even on the ground, and containing two eggs, 2¾ by 2 in., light cream-colored, with black and brown marks; both sexes incubate, each feeding the other and the young with the disgorged contents of the stomach; incubation lasts 32 days; only one brood is raised yearly.

Turkey Buzzard (Cathartes aura).

TURKISH LANGUAGE AND LITERATURE. The languages spoken by the different tribes of Turkish or Tartar origin form a principal division of the great Uralo-Altaic or Turanian family, of which the chief common characteristics have been pointed out under Turanian Race and Languages. They constitute together a well marked group of nearly related idioms; even the Yakut—the one which differs most from the rest, and is supposed to have severed itself from the main stem before the division of the latter into its other branches—is so distinctly a Turkish language that its relationship is apparent upon the most superficial examination; and it has been asserted, though with questionable accuracy, that a Yakut from the Lena could make himself passably understood at Constantinople. The Tartar dialects are for the most part known only by scanty vocabularies and the descriptions of travellers; a few have been treated grammatically; three or four, as the Uigur, the Jagatai or oriental Turkish, and the Osmanli, have received literary culture, and are to be studied in written monuments. Of these last, the dialect of the tribe which has been for 500 years dominant in European and Asiatic Turkey, or the Osmanli Turkish, as it is distinctively called, is of by far the greatest importance, and to it we shall chiefly direct our attention. Its peculiarities are such as naturally result from its position and its culture under the powerful influence of Arabic and Persian; every part of its vocabulary, and even some departments of its grammar, are filled with Arabic and Persian elements; so that it presents the remarkable and unique spectacle of a dialect made up of materials derived from the three grand and totally disconnected families of language, the Turanian, Semitic, and Aryan or Indo-European, to the detriment, of course, of its native character, by the corruption of its forms and the artificiality of its style. This is true especially of the language taught in the grammars and written in the literature; the vernacular idiom of the people is a much purer Turkish. The Osmanli is usually written with the Arabic alphabet, which is exceedingly ill suited to it, as to the Persian, since it marks the vowels very imperfectly, and in its distinction of consonantal sounds is in part defective and in part redundant; to construct the spoken alphabet and phonetic form of the language from the published grammars is well nigh impossible. It is also sometimes written with the Armenian alphabet, which represents it much more faithfully. It has nine vowels: four hard, *a*, *o*, *u*, and a peculiar guttural *i;* and five soft, *ä* (*a* flat), *e*, *i*, *ö* (French *eu*), and *ü* (French *u*). In the same word, as a general rule, only vowels of one or of the other of these classes are allowed to succeed one another; the dominant syllable, which is usually the final one of the root or theme, assimilating to its own character all that follow it. The consonants are *y*, *r*, *l ; ng*, *n*, *m ; s*, *z*, *sh*, *zh ; kh*, *gh*, *f*, *v ; k*, *g*, *t*, *d*, *p*, *b ; h ;* and the compounds *tch*, *j*. The language has no proper articles, although its numeral "one" and its demonstrative are sometimes used nearly as articles. The adjective is uninflected. The nouns have no distinction of gender; their plural is formed by the addition of *lar* or *ler*. There is no nominative case ending; the unchanged theme is employed as subject, in address (vocative), and also as indefinite object of a verb. Of cases, formed by inseparable affixed particles, which may properly be regarded as terminations of declension, there are an accusative, in *i ;* a genitive, in *ung ;* a dative, in *e ;* an ablative, in *den ;* an instrumental, in *le ;* and a locative, in *de*. These affixes are, saving certain slight euphonic changes, invariable; they are appended to the simple theme in the singular, and to the plural sign *ler* in the plural. The numerals are: 1, *bir ;* 2, *iki ;* 3, *ütch ;* 4, *dort ;* 5, *besh ;* 6, *elti ;* 7, *yedi ;* 8, *sekiz ;* 9, *dokuz ;* 10, *on ;* 11, *on bir*, &c.; 20, *yeyirmi ;* 30, *otuz ;* 40, *kirk ;* 50, *elli ;* 60, *eltmish ;* 70, *yetmish ;* 80, *seksen ;* 90, *doksan ;* 100, *yoz ;* 1000, *bing*. To form the ordinals, *inji* is added. The personal pronouns, which alone offer some anomalies of declension, are: I, *ben ;* we, *biz ;* thou, *sen ;* ye, *siz*. In the third person we have rather a demonstrative than a personal pronoun: that one, *ol ;* those, *anlar*. Possessive pronominal suffixes are: *m*, my; *miz*, our; *n*, thy; *niz*, your; *i* or *si*, his, hers, its; *lari* or *leri*, their. These are appended directly to the nominal theme, singular or plural, and the affixes of case follow them, as *baba-lar-um-dan*, from my fathers. There is no relative pronoun, except the Persian *ki*. The verbal roots are not always reducible to a monosyllabic form. From each root are formed a number of themes of derivative conjugation, by adding conjugational affixes; these are: for the passive, *il ;* for the reflexive, *in ;* for the reciprocal, *ish ;* for the causal, *der ;* and for the negative *me ;* which last, by prefixing *e*, becomes a sign of impossibility. Any or all of these affixes may be combined at once with a verbal root, so far as the idea admits of their combined modification; so that in theory we may have as many as 36 themes from one root, each conjugated throughout in the same manner as the simple root: *e. g.*, from *sev-mek*, to love (*mek* is infinitive affix), come *sev-il-me-mek*, not to be loved; *sev-der-il-mek*, to be made to love; *sev-ish-il-eme-mek*, not to be able to be loved by one another, &c. The root of the verb, without affix, is the second person singular imperative: *e. g.*, *sev*, love! The tenses and moods are of two kinds, simple and periphrastic. The former are formed either by appending a predicative pronominal suffix to a participle (except in the third person, which is left without suffix), or by adding a possessive suffix to a noun of action; thus, from *dogmak*, to strike: pres. part. *dogur*, striking; pres. *dogur-um*, striking-I, *i. e.*, I am striking, I strike; pret. *dogd-um*, striking-mine, *i. e.*, I have struck. The periphrastic tenses are formed by combining a participle or noun of action with an auxiliary verb; as *dogmish idum*, having struck was I, *i. e.*, I had struck. By these means, a great variety of more or less genuine verbal forms is produced, in the admission and classification of which, however, grammarians greatly differ; and the verbal paradigm is a very rich one as regards the number and nicety of its distinctions. What are prepositions in other languages are in Turkish postpositive affixes; but many proper prepositions are borrowed by it from the Arabic and Persian, and are placed and construed according to the usage of those languages. It is almost entirely destitute of any conjunctions except those of Arabic and Persian origin, some of which—as those for and, but, or, if, as, that—are in frequent and familiar use, although more in the formal and written style than in the conversational. The place of conjunctions is supplied by gerundives and possessive forms, through means of which the different members of a compound sentence are twined into one, with the principal verb always at the end. This position of the verb, together with the operation of the rule that the determining word must precede the determined, gives the Turkish construction an inverted form which often seems very strange.—LITERATURE. The earliest literature produced by any of the divisions of the Turkish race is that of the Uigurs, a remote eastern branch of the family, who originally occupied the country south of Lake Baikal, but later established themselves about the Tangnu Tagh, and played a conspicuous part in the contests and migrations of central Asia during several centuries, until their nationality was swallowed up in the Mongol empire, about A. D. 1200. Something of culture and Christianity was communicated to them from Syria, doubtless by Nestorian missionaries; and their scanty alphabet, of 14 characters, formed from the Syriac, became later the parent of the Mongol and Mantchoo alphabets. Most of the Uigur literature is lost, and of what remains only a few relics have found their way to Europe; little is known of it in detail, although it has been made to yield some information respecting the history of the people. They are said by the Chinese to have received and translated the Chinese classics and histories, and they are known also to have adopted to some extent the Buddhist doctrines and literature. The second era of Turkish culture dates from the conquest by Turkish tribes of the countries of Mohammedan Asia, beginning with the latter half of the 10th century. Overrunning first the N. E. provinces of Iran, and finding there the new Persian literature beginning its career, their wild chiefs became its admirers, patrons, and imitators, and the Turkish mind and language received that strong Persian impress which they have ever since borne. The eastern Turkish literature, or that produced beyond the Caspian, is usually called the Jagataian, from the name given to the country E. of the Oxus in the partition of the Mongol empire. It is much less abundant, and also much less known, than the literature of the western branch. Its most flourishing period was from the time of Tamerlane (1400) to that of Baber (died 1530). Its most admired author is Mir Ali Shir, the vizier of Sultan Hussein, and a munificent patron of Persian authors, particularly of the poet Jami; his most interesting work, perhaps, is his collection of biographies of earlier Jagataian poets, with specimens of their productions. The memoirs of his own life and times by Sultan Baber, the conqueror of Hindostan and founder of the Mongol dynasty, cover a period of nearly 40 years, and are written with entire simplicity and naturalness. The astronomical works prepared at Samarcand, under the patronage and direction of Ulugh Beg (died 1449), grandson of Tamerlane, deserve honorable notice.—The literature of the western or Osmanli Turks, to which alone we usually apply the name of Turkish literature, is exceedingly rich, but it is upon the whole of inferior interest, because it contains so little that is original and distinctively national in style and spirit. It is mainly an imitation, more or less successful, of Persian models, but in part also of Arabic. As the language of the Osmanlis is full of Persian words, compounds, phrases, and even forms of construction, so is their history, their philosophy, their poetry, a reworking of Persian material, an echo of Persian taste. The history of the Osmanli literature begins with that of Osmanli nationality; even before the power of the dynasty was established by the capture of Constantinople, works had been produced which the nation has never let perish, and has hardly excelled; prominent among the great names of this era are those of Sheikhi, the romantic poet, and also the ablest physician of his time, of Solyman Tchelebi, and of Nesimi the free-thinker. But the most flourishing period in the whole history of the literature was the 16th century, chiefly during the reigns of Solyman the Magnificent and his son Selim II. Meshihi, renowned as an elegiast, and Kemal Pasha Zadeh, a man of universal learning and an admired author in many different departments, especially in history and in Moslem jurisprudence, wrote early in the century. Both these branches are of great importance and prominence in the Turkish literature. The latter, of inferior interest to us, but of the highest consequence to the Turks themselves, in its double aspect, religious and legal, and indispensable to those who would fully understand the internal life of the nation, is illustrated by an unbroken series of great writers. In history, besides general and independent authors, such as Mohammed Effendi, Betchevi, and Hadji Khalfa, the line of official historiographers and annalists of the realm, commencing with Saad ed-Din, deserve especial notice. Among his successors were Naima, Reshid, Izzi, and Vasif. Notwithstanding the turgid and affected style of the official historians, they are most valuable authorities for the history of the Ottoman empire, in its internal and its external relations. Saad ed-Din wrote under Solyman, and has been excelled by none who came after him in dignity and philosophic spirit; he brought the story of the rise and growth of the Turkish power down to 1526. Of the same period is Lami'i, one of the most highly esteemed of Turkish authors, and in some departments quite unsurpassed; his works are both in prose and verse, and include many translations from the Persian. Fasli, distinguished by depth of thought and tenderness of sentiment, lived till 1563. But the chief ornament of the century is Baki, the acknowledged prince of Turkish lyric poets, and ranked by the orientals with the Persian Hafiz and the Arab Motanebbi in the trio of unrivalled masters of song. He died at a great age in 1600. A new period of literary activity and excellence, although decidedly inferior to that already referred to, followed in the 17th century, under the patronage of the great vizier Köprili, in the reign of Mohammed IV. Most worthy of note here are Nebi, the most admired poet of the century, Nefi, the first of Turkish satirists, Naima the historian, and Hadji Khalfa, the historian, geographer, biographer, and encyclopædist, a man of immense learning and industry, whose history of Arabic, Persian, and Turkish literature, in Arabic, is a chief authority upon its subject, for both the East and the West. In the 18th century, the distinguished vizier Raghib Pasha is eminent both as an author and as a patron of learning; but among the innumerable writers, in every department, of the last century or two, there are few who deserve to be particularly noticed; we may mention merely Said Rufet Effendi, Aini Effendi, and Pertev Effendi as the most esteemed poets. The Turks have done little for the grammatical and lexicographical illustration of their own language, but a great deal for that of the Arabic and Persian. The press was introduced into Constantinople early in the 18th century, by Ibrahim Effendi, and, both there and elsewhere, has been actively engaged in publishing the most important works in Arabic, Persian, and Turkish, especially the last (including the series of official histories), together with hosts of less valuable or altogether insignificant productions. Many translations have been made by the Turks of European as well as oriental works. Among original works are a history of the Turkish sultans by Hajruhah Effendi (1854 *et seq.*), the biographical works of Resnü Ahmed Effendi and Faik (1853), the works of travel by Mehemed Khurshid Effendi (1861), and Prince Subti's numismatical writings (1862). Several societies have been established in Constantinople for the promotion of various branches of scientific research, and besides the regular journals of these, several literary and scientific magazines of some merit are now published. The most accessible and useful grammars are those of Davids (London, 1832) and Redhouse (in French, Paris, 1846). Kazem-Beg's grammar (in Russian; German by Zenker, Leipsic, 1848) includes also the other dialects, and is valuable for the comparative study of the language. Böhtlingk's Yakut grammar (in German, St. Petersburg, 1851) is also important in this bearing. Of chrestomathies, we have one by Dieterici (in French, Berlin, 1854), and Barker's reading book, grammar, and vocabulary (London, 1854). The best dictionaries are those of Kieffer and Bianchi (2d ed., Paris, 1843–'6, Turkish-French), and Redhouse (London, 1856–'7). A new and more complete one, by Zenker, explained in French and German, and embracing the Turkish, Arabic, and Persian languages, is now (1876) nearly completed.

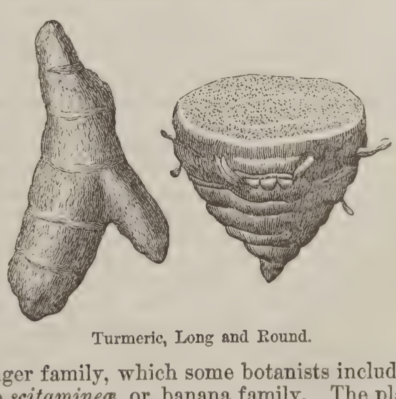
TURKISTAN, a region of central Asia, extending from the Caspian sea eastward half way across the desert of Gobi, mainly between the 36th and 46th parallels of N. latitude, bounded N. by the Russian dominions, and S. by Persia, Afghanistan, India, and Thibet. Its name is due to the fact that it is considered the earliest known abode of the Turks or Turkomans, and thus as a seat of the Tartar race it has also long been called Tartary. The region is separated into the two great natural divisions of East and West Turkistan by the junction of the Thian-shan mountains with the Hindoo Koosh in the lofty table land of Pamir, which is a ridged plateau, rising W. of Kashgar to an average altitude of 15,000 ft. above the sea. According to Humboldt, the two great ranges are united by a transverse chain, called the Belur or Bolor Tagh (Cloud mountains), bordering Pamir on the east, the separate existence of which, however, is rendered doubtful by recent explorations, although commonly assumed on maps of Asia.—West Turkistan, formerly known as Independent Tartary, comprises the khanates of Khiva and Bokhara, the former khanate of Khokan, annexed by Russia in March, 1876, the territories previously annexed by Russia from the three khanates, and in the south Wakhan, Badakhshan, Koondooz (including Khooloom), and Balkh, lately incorporated into Afghanistan. East Turkistan, also called Chinese Tartary, is the extensive region E. of the table land, in which Kashgar is now the paramount state.—The hydrographic systems of Turkistan originate in the lofty, lake-studded region of culmination which we have mentioned. On the southern edge of the Pamir steppe, in the Sir-i-kol (Lake Sir), according to the latest authorities 13,900 ft. above the ocean, rises the Oxus or Amoo Darya, flowing westward down the steep slope of the plateau through Bokhara and along the border of Khiva into the sea of Aral. The Sir Darya or Jaxartes, which under the name of the Naryn has its source in the Thian-shan range 300 m. N., and also empties into the Aral sea, waters Khokan and the N. part of Russian Turkistan. Between these two great rivers, and enclosed by parallel ranges stretching westward from the central table land, runs the smaller Zerafshan, in whose fertile valleys are the cities of Bokhara and Samarcand. Though naturally an affluent of the Oxus, its waters are exhausted for irrigation. Down the eastern and more gradual slope of Pamir into Chinese Tartary flow numerous streams, of which the most important are the Yarkand and Kashgar rivers, which are believed to coalesce with others to form the eastward-flowing Tarim, emptying into Lob-nor, the great lake or swampy expanse of the Gobi desert.—Of West Turkistan, Khiva, Bokhara, Khokan, Badakhshan, and Balkh have been described under their own titles. The territory is naturally divisible into three physical regions. The first comprises the more elevated mountainous districts among the outlying spurs of the Pamir steppe, which afford rich summer pasturage for the flocks of the hardy inhabitants. Thence flow innumerable torrents to the Oxus, the Sir Darya, and their tributaries, and enrich the alluvial soil of their upper valleys and plains, constituting the second distinctive region, which is populous, fertile, and well cultivated. Here are found the principal cities. Still further westward toward the sea of Aral, the area of cultivation ceases, and the rivers flow through the third region, comprising vast tracts of arid saline deserts, only relieved at the delta of the Oxus by the facilities there for irrigation. Almost the entire country stretching from the shores of the Caspian eastward to the valley of the Oxus, and from lat. 45° southward to the frontiers of Persia and Afghanistan, is occupied by the Turkoman steppes, including the Ust-Urt plateau between the Caspian and the sea of Aral, of which the Tchink mountains constitute the S. declivity, and the Khiva or Kara-Kum desert, S. of Khiva. Many parts of these sandy and trackless wastes are below the level of the sea. The ancient bed of the Oxus leading to the Caspian traverses the country, whose chief rivers now are the Murghab from Afghanistan, which loses itself in the sands N. of the town of Merv, and the Attrek, on the southern border. The wells of the desert yield only brackish or bitter water. Almost all is confined to their vicinity or that of the streams. The climate is always dry, exceedingly hot in summer, and very cold in winter, which however is short. Salt and sulphur are obtained on the steppes. The animals of the desert comprise gazelles, horses, asses, pigs, foxes, and hares.—Although preserving a nominal independence, Khiva and Bokhara are practically subject to Russia. The portions annexed by the Russians previous to the annexation of Khokan in 1876 have been united with a part of the Siberian province of Semipolatinsk to form the government general of Turkistan; area in 1875, about 400,000 sq. m.; pop. about 2,000,000. It comprises all that part of the country which is N. of the khanates and the Thian-shan range, from Kulja inclusive on the east (see KULJA) to the sea of Aral on the west, with the lower course of the Oxus for the S. W. frontier. But Kulja is usually regarded by geographers as belonging not to Turkistan, but to Dzungaria or Sungaria, a country inhabited by Kirghiz, Olots, the once powerful tribe of the Dzungarians, and others, the Chinese portion of which lies between the Thian-shan mountains, the Altai, and Mongolia. The western part of Russian Turkistan is overspread with steppes. The desert of Kizil Kum (red sand) occupies the region between the Oxus and the river which gives the province its name. The eastern part of the government general is mountainous. It is drained by the river Ili, flowing into the great Balkash lake, and the Tchu river, flowing N. W. from the vicinity of the more southerly lake Issik-kul. Lake Balkash is 780 ft. above the sea level, and has an area of 400 sq. m., while Issik-kul covers about 335 sq. m. of surface at an altitude of 4,540 ft. The most populous parts of Russian Turkistan (exclusive of Khokan) are in the vicinity of the principal towns, Tashkend, Samarcand, and Khojend. The plains are permanently habitable and capable of cultivation only in the neighborhood of the watercourses. The mineral wealth of Russian Turkistan, especially in gold and coal, is supposed to be large, but remains undeveloped. The government is divided into nine administrative districts, besides Khokan. The governor general, who is also the military commander-in-chief, has his headquarters at Tashkend.—The fundamental classification of the inhabitants of West Turkistan, according to Mr. R. B. Shaw, is into Turks or Tartars and Tajiks or Aryans. A cross classification is into the Kirghiz or nomads and the Sarts or settled population. In the towns of West Turkistan the Tajik element predominates in numbers, except in Khokan. In this race the features are handsome, the complexion fair, the face usually bearded, and there is a general resemblance to the Aryans of northern India. The language of the Tajiks is a variety of Persian. In the khanates the Uzbecks are the ruling class, whose nomadic kinsmen are the hordes of Kirghiz in the north and east, and the Turkomans of Khiva and the adjacent steppes. The Kirghiz are described as stunted in appearance, with prominent cheek bones, flattened noses, and scarcely any beard. The Uzbecks of the towns are handsomer, with some resemblance to the Tajiks in many cases. The Turkoman is generally above middle stature, powerfully developed, with a white skin, round head, small nose and chin, and scanty whiskers. A careful estimate of all the tribes indicates that their number is about 8,000,000 persons. They are fierce, haughty, and given to deeds of rapine and plunder, irascible and violent, but usually truthful and hospitable. All the tribes mentioned are Sunni Mohammedans.—The commerce of the country is considerable, and is conducted entirely by means of caravans. Native productions form but a small part of this commerce; but the towns are convenient places of exchange for the products of Russia, Persia, Afghanistan, India, and the Chinese empire. The manufactures consist chiefly of some silk and cotton stuffs, sabres, knives, and other weapons. The exports are cotton, mostly from China, wool from Thibet, fruits, hides, sheepskins, and silk. The imports are muslins, brocades, sugar, shawls, and white cloths from India; European manufactured goods from Russia; porcelain, musk, tea, rhubarb, and cotton from China; and wool from Thibet.—East Turkistan is bounded N. by the Thian-shan range, E. by the desert of Gobi, S. by Cashmere and Thibet, and W. by the Pamir plateau. Its area is estimated at about 500,000 sq. m., and its population at from 600,000 to 1,000,000. The country has long been denominated Alti-shahar or Alti-tchakan (the six cities), from the towns of Kashgar, Yarkand, Khoten, Yang-shahr, Ush-Turfan, and Aksu, which constitute its principal centres of population and trade. It is now divided into seven provincial governments under the ruler of Kashgar. The portion bordering Pamir is extremely mountainous, as are also the northern and southern frontiers; but the interior is an extensive plain with a general elevation of from 3,000 to 5,000 ft., described by Shaw as resembling an immense bay with its convex side toward the mountains and its concave side toward the desert. The chief rivers are affluents of the Tarim, the course of which extends about 500 m. from the 81st meridian eastward into the desert; among them are the Khoten from the south, the Yarkand from the southwest, and the Kashgar from the west, all named from the largest cities on their banks. The climate is extremely dry, and the land is therefore a desert except where there is natural or artificial irrigation. The temperature in the west ranges from 26° below zero in winter to 150° above in summer, but in the east and south is more equable. Along the streams are fertile belts of productive soil, where the vegetation is most abundant, and under the intense heats of summer many of the semi-tropical fruits and vegetables ripen. The field crops are cotton, rice, wheat, hemp, flax, barley, and maize, while the gardens produce tobacco and melons, and the orchards of the more favored districts yield an abundance of apples, pears, peaches, apricots, and other fruits. The herds of cattle are very large, and afford the principal article of export. The wild animals are generally the same as those of West Turkistan, with the addition of the tiger, the panther, and a peculiar species of stag found in the Lob-nor region of forest, jungle, and reed growth. The minerals are gold, found in the mountain streams and in the Thian-shan mountains, silver, iron, copper, nitre, sal ammoniac, sulphur, asbestus, agate, and the precious jasper, which was formerly a monopoly of the Chinese empire. The inhabitants are not so distinctly classified as the tribes of West Turkistan, all of which, however, are represented in those parts of the country to which modern exploration extends. The Turanian element is most prominent, although Shaw regards the Yarkandees as Tartarized Aryans. The inhabitants of the Lob region are a wild race of huntsmen, concerning whom little is known. The ruling class consists mainly of Uzbecks and Kiptchaks. Sunni Mohammedanism is the prevailing religion. The villages are made up of aggregated enclosures, each wall surrounding a house and a garden or fields.—The western part of Turkistan was known as Turania to the ancient writers on Persia. It was the theatre of repeated terrible conflicts between the Iranian or Persian and the Turanian races, in the early ages of Persian history, and the Persian hero Jemshid figures as largely in some of these as Achilles in those of the early Greeks. The Iranians finally remained masters of the southern part of the country, and at the beginning of the historic period it was comprised in the Persian satrapies of Bactria and Sogdiana, which were afterward conquered successively by Alexander the Great, the Parthians, the later Persians, the Arabs, and the Tartars or Mongols of Genghis Khan and Tamerlane, under whom the Tartar elements almost entirely replaced the Indo-European. The Mongols ruled over the southern portion till about the beginning of the 16th century, when their sultan Baber, the future founder of the Mogul empire in Hindostan, was driven out by the Turkish tribe of the Uzbecks. The Uzbecks established a powerful monarchy, which continued about 160 years, and then separated into numerous independent khanates, of which Bokhara, Khiva, and the late khanate of Khokan are the modern representatives. For the history of the advance and establishment of the Russian power in this region, see Bokhara, Khiva, and Russia. The Russian province of Turkistan, already described, was established in 1865, and the influence of Russia is paramount throughout all this part of Asia. The various forts and towns are garrisoned by a military force, numbering in 1874 about 30,000 enlisted men. In East Turkistan the chief state is now Kashgar, and the history of the country is given under that title.—See Vámbéry's "Travels in Central Asia" (London, 1865), "Sketches from Central Asia" (1867), and "Bokhara, its History and Conquest" (1873); *Die Russen in Centralasien*, by Friedrich von Hellwald (1874); "Khiva and Turkestan," translated from the Russian by Capt. H. Spalding (1874); "England and Russia in the East," by Sir Henry Rawlinson (1875); and, as to East Turkistan, Robert Shaw's "High Tartary, Yarkand, and Kashgar" (1871), and "Kashmir and Kashghar," by Dr. H. W. Bellew, C. S. I. (1875), being a narrative of Sir Douglas Forsyth's embassy from India to Kashgar in 1873–'4.

TURKOMANS. See Turkistan, and Turks.

TURKS, one of the most important branches of the Turanian family. (See Turanian Race and Languages, and Turkish Language and Literature.) In former ethnological classifications they were sometimes set down as a Caucasian race, and in physical characteristics some of their tribes are nearly or quite Caucasian; but more recent science shows that they have no connection with the Aryan or Indo-European family. They made their first appearance in northern and central Asia among the Hunnic and Tartaric hordes who for several centuries before and after our era were the terror of the Chinese. (See China, vol. iv., p. 459, Huns, and Tartars.) Turk is used in central Asia as synonymous with Tartar, or to designate the Mongolians generally. Before the commencement of the Christian era a tribe of Turks had wandered westward as far as the Don; they are mentioned by Pliny under the name of Turcæ, and by Pomponius Mela under that of Iurcæ; while other tribes had not long after penetrated into the mountainous regions of Asia Minor. In the 4th and 5th centuries of the Christian era a portion of the Turks who had remained in N. W. China conquered two provinces of that country, which they organized as independent kingdoms, to which the Chinese give the names of Chao and Northern Liang; but the greater part of those who were driven out in the 3d century rallied around Lake Balkash, and after the 5th century made no further separate appearance in history. In the early part of the 6th century a new Turkish empire, apparently having its nucleus in what is now East Turkistan, threatened the peace of Asia. These Turks renewed their conflicts with China at the east, and with Persia at the southwest, and in 569 formed an alliance with Justin II., then emperor of Constantinople, for the overthrow of the Sassanides. But this Turkish empire (which the Chinese called Tu-kiu), like all the attempts of the Turks at imperial domination, was an agglomeration of dissimilar peoples in one huge nation, with no common bond of union or citizenship, and its very vastness contributed to its weakness. In 744 the empire was overthrown by the attacks of the Hoei-he or Hoei-hu, as the Chinese named them (the Uigurs of western writers), another Turkish tribe who had previously been subjects of the Tu-kiu empire. There were at this time, and had been for some centuries, eight distinct Turkish tribes or nations in central Asia. The Uigurs never attained to the vast power of their predecessors, but they were the first of the Turkish tribes to adopt a written language. At first they were Buddhists; but about the 4th century they became very generally disciples of Zoroaster, and in the 9th or 10th century embraced Islamism. In the west their empire was overthrown in 848 by the Kirghiz Tartars; but they maintained an independent kingdom in the valleys of the Thian-shan range till about A. D. 1000, when the increasing power of the Khitans in China compelled their emigration westward. The invasion of Genghis Khan overthrew the last remains of the Turkish empire in central Asia; but the prominent officers of that conqueror and his successors were taken from this very tribe of Uigurs on account of their superior intelligence. But meanwhile the Turks had been acquiring new territories in the west. In the 6th and 7th centuries they were already in possession of an extensive region in what is now Asiatic Turkey, and were pressing forward toward S. E. Europe. In the 9th and 10th centuries the Tulunides and Ikshides, who founded short-lived dynasties in Egypt before the Fatimites, were Turks. In the 9th century a Turkish dynasty, the Taherides, ruled in Khorasan; and their successors, the Ghuznevides and the Ghorides, extended their sway from Persia to India between the 10th and 12th centuries. But a more famous Turkish dynasty than either of these was that of the Seljuks, whose dominion extended in the latter part of the 11th century from the frontiers of China to the vicinity of Constantinople. (See SELJUKS.) Like its predecessors, this vast empire crumbled to pieces from its want of homogeneity, and the Seljukian sultans submitted to be tributaries of the Mongol emperors. About the beginning of the 14th century the Ottoman empire was founded by Othman, a Turkish chief, and in the succeeding centuries spread over a vast territory in Asia and Europe. (See TURKEY.) The Turkish tribes which had submitted to the Mongol invasion in the 13th century, and still remained in the region of the Thian-shan mountains, the Aral, and the Caspian, sent out colonies N. of the Caspian into that portion of southern Russia lying on the borders of the Black sea, where, under the name of Tartars, several tribes of them still occupy extensive territories. While acknowledging the Russian sway, they are still zealous Mohammedans. The Mongol invaders of Turkistan, instead of impressing their own habits and language upon the Turks of that country, gradually became identified with the people they had conquered; and eventually, the Turkish element again predominating, in the age following the death of Tamerlane they had invaded and subdued Armenia and the countries bordering on the Tigris and Euphrates. From this region they were expelled in the 16th century by the Sufis. In the same century the Uzbecks, a Turkish tribe, primarily inhabiting the southern provinces of Chinese Turkistan below the Thian-shan mountains, and said to be descendants of the Uigurs and the Naimans, made their way westward, and overran not only East Turkistan but the countries adjacent as far as the Euphrates, and were, after maintaining their power for more than a century, reduced to subjection by still another Turkish tribe, the Turkomans. The Turkomans and Uzbecks are now, in the ancient seat of the Turks, the principal remaining tribes of that powerful race. The Calmucks between the lower Volga and Don, the Bashkirs between the Volga and Irtish, and the Yakuts on the banks of the Lena, are also Turkish tribes. The Yakuts are the only Turkish race professing Shamanism.

TURK'S ISLANDS, or **Turques,** a group of islets in the S. E. extremity of the Bahama archipelago, about 90 m. N. of Hayti; pop. about 2,500. The population fluctuates greatly at different times, as many people annually come from the Bermudas to work at salt raking, returning when the season is over. The islands are completely barren, and all kinds of supplies are imported. Grand Key or Turk's is the principal island. Since Jan. 1, 1874, the group with the Caicos group has been under the legislative control of Jamaica. The ports of entry are Grand Turk, Salt Cay, East Harbor, and West Caicos. The chief export is salt. For the year ending Sept. 30, 1874, the entries were 5 steamers of 3,555 tons, and 344 sailing vessels of 47,879 tons; total value of imports, $100,622; of exports, $115,682.

TURMERIC, a name of unknown origin, given to the rootstocks of several species of *curcuma* (Pers. *kurkum*, the name also for saffron, and applied to this because of its similarly yellow color), especially to *C. longa*, plants of the ginger family, which some botanists include in the *scitamineæ* or banana family. The plants are indigenous to southern Asia, and are culti-



Turmeric, Long and Round.

vated in various eastern countries. They have perennial, palmately divided, tuber-like rootstocks, and annual stems; the large lanceolate leaves are radical, and from among them rises a short stem, bearing a thick spike, from between the bracteal scales of which the flowers appear in succession, much as in the related ginger and arrowroot, figured under their titles. In commerce the rhizomes are called roots, and are distinguished as long and round, though both are produced by the same plant, and are also known by the names of the localities of export, each of which has its long and round kinds. Long turmeric is about the size of the little finger, 2 or 3 in. long, curved, and tuberculated from a tendency to branch; the round is more usually oval, an inch thick and 2 in. long; both kinds are marked by transverse scars or wrinkles, are yellowish externally, and internally orange-yellow or reddish brown; they have an odor like that of ginger, but peculiar, and a warm aromatic taste, and when chewed tinge the saliva yellow; they form an orange-yellow powder, the condition in which they are generally kept in the shops. The drug contains about one per cent. of an essential oil, and a peculiar coloring matter, curcumine, which is crystallizable, almost insoluble in water, but very soluble in alcohol and ether. Turmeric was formerly employed in medicine as an aromatic tonic, but its use is now solely to color ointments, tinctures, and other preparations. Though the color is fugitive, it is considerably used in dyeing; it gives a fine yellow upon silk, and is used as the basis of some greens, and upon woollens to produce some shades of brown. It forms an important ingredient in curry powder (see CURRY), and is much used to color varnishes (see LACQUER). The changes produced in curcumine by alkalies and other chemical agents make it available as a test; turmeric paper, made by staining paper with a tincture of the root, is often employed in the laboratory as a useful though not very accurate test, as one acid at least produces a reaction similar to that of the alkalies. Turmeric paper touched with an alkaline solution changes from yellow to brownish red, becoming violet on drying; boracic acid produces a similar change, but the tint is orange, and when an alkali is added it turns to blue.

TURNBULL, Robert, an American clergyman, born at Whiteburn, Linlithgowshire, Scotland, Sept. 10, 1809, died in Hartford, Conn., Nov. 20, 1877. He graduated at Glasgow university, studied theology, preached for a short time in Scotland and England, and in 1833 settled in Danbury, Conn. In 1835 he became pastor of the Baptist church in Detroit, in 1837 of the South Baptist church, Hartford, Conn., in 1839 of the Boylston street (now Harvard street) Baptist church in Boston, and in 1845 of the first Baptist church in Hartford. In 1851 he received the degree of D. D. from Madison university. He published "The Theatre" (Boston, 1840); "Olympia Morata" (1842); "Vinet's Vital Christianity," translated, with an introduction and notes (1846); "The Genius of Scotland" (New York, 1847); "The Genius of Italy" (1849); "Theophany, or the Manifestation of God in Christ" (Hartford, 1851); "Vinet's Miscellanies" (New York, 1852); "Pulpit Orators of France and Switzerland" (1853); "Christ in History, or the Central Power" (Boston, 1856); and "Life Pictures, or Sketches from a Pastor's Note Book" (New York, 1857). He edited Sir William Hamilton's "Discussions on Philosophy," and was for several years editor of the "Christian Review."

TURNER, a S. E. county of Dakota, recently formed, and not included in the census of 1870; area, 648 sq. m. It is intersected by Vermilion river, and consists of fertile prairies and bottom lands. Capital, Swan Lake.

TURNER, Joseph Mallord William, an English painter, born in London, April 23, 1775, died in Chelsea, Dec. 19, 1851. His father was a hairdresser in Maiden lane, Covent Garden, and in this neighborhood the painter passed his childhood. After a year or two of schooling, during which he occupied himself more with sketching from nature than with books, he was employed by the engraver John Raphael Smith to color prints, and afterward he put in skies, backgrounds, and other accessories for architectural designs. Dr. Munro gave him and Girtin access to his collection, and bought their water-color sketches. In 1789 he became a student at the royal academy, and in 1790 he exhibited a water-color "View of the Archbishop's Palace, Lambeth." Other works depicting scenes in the neighborhood of London followed, and with each year he showed increasing power and originality. In 1793 he was engaged to illustrate Walker's "Itinerant" and the "Pocket Magazine;" and during the next five or six years he made sketches in many parts of England, besides giving lessons in drawing and devoting much time to illustrating books. In 1799 he was elected an associate of the academy, and in 1802 an academician. He had hitherto been best known as a water-color painter, and had confined himself chiefly to representations of English or Welsh scenery. He now produced in oil such subjects as "The Fifth Plague of Egypt," "The Army of the Medes destroyed in the Desert by a Whirlwind," and "The Tenth Plague of Egypt;" but these were less popular than his "Dutch Boats in a Gale," "Fishermen upon a Lee Shore in Squally Weather," or "Falls of the Clyde," which afforded a field for the display of the surpassing excellence of his representations of marine scenery and of water under all conditions. In 1802 he visited France, and commemorated his arrival there by a picture of "Calais Pier;" and thenceforth at irregular periods he made extended tours through France, Switzerland, and the Rhine land, the fruits of which appeared in numerous sketches, drawings, and finished pictures. In 1807 he was elected professor of perspective to the royal academy. His works may be divided into three periods. The first extends to 1802, and covers the time employed chiefly in painting English scenes in water colors, and in studying the works and methods of his English predecessors. The second period, from 1802 to 1829, shows the effects of foreign travel and study of the great continental masters. His desire to rival and if possible to surpass Claude Lorraine led to the publication in 1808 of his *Liber Studiorum*, the superiority of which over the *Liber Veritatis* of Claude does not however afford a fair test of the comparative merits of the two painters; Turner's studies being elaborate and careful illustrations of all the principal forms of landscape composition, while Claude's are but incidental memoranda of pictures. In further competition with Claude he painted his "Sun rising through a Mist," "Crossing the Brook," "Apuleia in search of Apuleius," "Dido building Carthage," and some others of less note; but his individuality soon broke through the shackles of mere imitation, and from 1815 he worked according to his own ideas, indifferent to the examples of preceding masters. The variety of subjects he attempted during the 12 years previous to this time exhibits the originality and audacity of his genius. Not content with the production of works like "The Shipwreck," "The Wreck of the Minotaur," and "The Snow Storm—Hannibal crossing the Alps," which presented with incomparable power the elements in their wildest fury, or like the "Edinburgh from Calton Hill" and "Falls of Schaffhausen," he ransacked Lempriere's dictionary for subjects, painted humorous pieces, such as a "Country Blacksmith disputing upon the Price charged to the Butcher for Shoeing his Pony," and even attempted sacred history, having in 1803 exhibited a "Holy Family." From 1815 his conceptions expanded with his increasing observation; and after his first visit to Italy in 1819 his style underwent a material change, light instead of dark now predominating in his pictures. His return from his second visit to Italy in 1829 begins his third period, when he employed an entirely original style. His "Bay of Baiæ," "Ulysses deriding Polyphemus," "Caligula's Palace and Bridge," "Childe Harold, or Modern Italy," "Slavers throwing overboard the Dead and Dying—Typhoon coming on," "The Fighting Téméraire towed to her last Moorings," and other works produced within this period, represent the highest efforts of landscape painting in composition, in color, and in the general vein of poetic sentiment which pervades them. The change in his style of coloring, dating from this second visit to Italy, consists in an increased diffusion of light proceeding from the more illuminated parts of the landscape, and forming a bluish haze which contrasts too strongly with the surrounding portion in shadow. From 1833 this diffusion of light becomes more and more vertical, and from 1839 the vertical streaks are apparent in all his pictures. Every illuminated point is changed into a vertical line, the elongation being generally in exact proportion to the brightness of the light. Dr. R. Liebreich, ophthalmic surgeon of St. Thomas's hospital, London, in a lecture before the royal institution, March 8, 1872, attributes this change to a change in Turner's eyes, developed during the last 20 years of his life. After he reached the age of 55, Dr. Liebreich believes, the crystalline lenses of his eyes became dim, dispersed light more strongly, and consequently threw a bluish mist over illuminated objects. The aspect of nature gradually changed for him, and he reproduced what he saw. After his last visit to Italy in 1840, and during the last ten years of his life, the tendency toward brilliancy of light and color became the most marked feature of his style; and, disregarding individuality of form or local color, he made light with all its prismatic varieties the sole object of his studies. In one department of his art, that of designing from nature for illustrated works, Turner remained in the highest request until the close of his life; and in none of his productions does he appear more truly great than in his finished drawings and engraved designs. Among the most famous of these are his "Rivers of England," "Rivers of France," "England and Wales," "Scenery of the Southern Coast," and the exquisite illustrations of the poems of Rogers, Byron, Scott, and others, in all of which he shows a knowledge of landscape in its infinite variety of forms superior to that of any other artist. Fine line engravings of large size have also been executed from some of his most remarkable paintings; and, as if conscious that his reputation was destined to rest in a great measure upon this class of his works (an anticipation which has partially proved correct, as many of his pictures, owing to a careless use of pigments and varnishes, are rapidly losing their effects and crumbling to decay), he devoted much time to retouching the proofs, adding and altering the details down to the minutest twig; and all of his pictures engraved during his lifetime were executed under his own supervision. From 1790 until his death he contributed to every academy exhibition except three, sending altogether 259 pictures.—Turner never married, and exhibited an eccentricity which, whether real or assumed, subjected him to many injurious aspersions. One of his most prominent characteristics was a love of mystification, under the influence of which he worked and travelled alone, often concealed his abode for months from his most intimate friends, and died finally after a protracted absence from London in lodgings at Chelsea, where he was known under the name of Brooks, his legal adviser being the only friend acquainted with his abode. He bequeathed the bulk of his large fortune to found an asylum for decayed artists, to be called "Turner's

Gift," and such of his pictures as were in his possession to the nation. His intentions were partially thwarted by the unskilful manner in which the will was drawn; and while his pictures, drawings, and sketches have been secured to the nation, the remainder of his property, with the exception of £20,000 appropriated to the royal academy, was divided among his next of kin. The oil paintings, numbering upward of 100, and comprising specimens of his style from the outset to the termination of his career, are in the national gallery. Two of them, "The Building of Carthage," which he esteemed so highly that he is said to have announced his intention of being buried in it, and "Sun rising through a Mist," he directed should be hung next to prominent works by Claude. The drawings, studies, and sketches, numbering altogether upward of 19,000, have been cleaned, mounted, and arranged by Mr. Ruskin. Turner wrote a poem in blank verse entitled "The Fallacies of Hope," extracts from which, for the most part "destitute of rhyme, rhythm, or reason," were frequently appended to the titles of his pictures in the royal academy catalogues.—The prominent position which Turner occupies is largely due to John Ruskin, whose "Modern Painters" contains an exhaustive analysis of his works. His remains were buried in the crypt of St. Paul's, beside those of Reynolds, and his statue by McDowell was erected in the cathedral in 1863. The only extended biography of Turner is by Walter Thornbury (2 vols., London, 1862; new ed., 1874).

TURNER, Samuel Hulbeart, an American clergyman, born in Philadelphia, Jan. 23, 1790, died in New York, Dec. 21, 1861. He graduated at the university of Pennsylvania in 1807, studied theology, and was ordained deacon in the Protestant Episcopal church, Jan. 27, 1811. He became rector of the church at Chestertown, Md., in 1812, resigned in 1817, and officiated for a time in New York and Brooklyn. In 1818 he was elected professor of historic theology in the general theological seminary in New York, and in 1821 of Biblical learning and the interpretation of Scripture. From 1830 he was in addition professor of Hebrew in Columbia college. He published "Notes on the Epistle to the Romans" (1824); "Companion to the Book of Genesis" (1841); "Biographical Notices of Jewish Rabbis" (1847); "Parallel References of the New Testament" (1848); "Essay on our Lord's Discourse at Capernaum" (1851); "Thoughts on Scriptural Prophecy" (1852); commentaries on Romans, Hebrews, Ephesians, and Galatians (1852–'6); "Teachings of the Master" (1858); "Spiritual Things compared with Spiritual" (1859); "The Gospels according to the Ammonian Sections and the Tables of Eusebius" (1861); and, in conjunction with Bishop Whittingham, "Introduction to the Old Testament," from the Latin and German of Jahn (1827), and "Introduction to Sacred Philology and Interpretation," from the German of Planck (1834). His "Autobiography" was published in 1862.

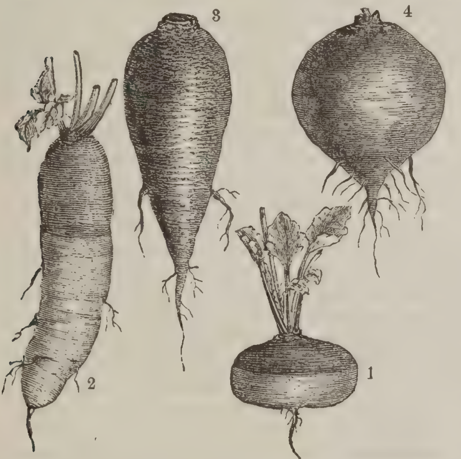
TURNER. I. Sharon, an English historian, born in London, Sept. 24, 1768, died there, Feb. 13, 1847. He was an attorney, but retired from business in 1829. His most important works are a "History of the Anglo-Saxons" (4 vols. 8vo, 1799–1805; 7th ed., revised by his son Sydney, 3 vols. 8vo, 1852), and a "History of England in the Middle Ages, with a Continuation to the Death of Elizabeth" (5 vols. 4to, 1814–'29). He also published "Inquiry concerning the Early Use of Rime" (1802); "Sacred Meditations by a Layman" (1810); "A Prolusion on the Recent Greatness of Britain, and other Subjects" (1819); "A Sacred History of the World, as displayed in the Creation and subsequent Events to the Deluge" (3 vols. 8vo, 1832 *et seq.*); and "Richard III., a Poem" (1845). **II. Sydney,** an English clergyman, son of the preceding, born April 2, 1814. He graduated at Trinity college, Cambridge, in 1836, and in 1838 became superintendent of the reformatory school of the philanthropic society in London, and effected its reorganization as the Red Hill reformatory near Reigate in 1846. In 1857 he became inspector of reformatories in England and Scotland. He has published "Reformatory Schools, a Letter to C. B. Adderley, Esq., M. P." (8vo, 1855), and an enlarged edition of his father's "Sacred History of the World."

TURNER, William, an English naturalist, born in Morpeth, Northumberland, about 1515, died July 7, 1568. He studied medicine and divinity at Cambridge, took part in the religious discussions of the time, and was imprisoned. After his release he studied natural history at Zürich and Bologna. Upon the death of Henry VIII. he returned home, and in the reign of Edward VI. became physician to the protector Somerset, and later prebendary of York, dean of Wells, and canon of Windsor. He again lived abroad during the reign of Mary. The work on which his reputation rests is his "Herball," the first book of which appeared in London (fol., 1551), and the second at Cologne (1562). He wrote also *Avium Præcipuarum, quarum apud Plinium et Aristotelem Mentio est, Historia* (8vo, Cologne, 1554), and the account of British fishes in Gesner's *Historia Animalium;* and published a collation of the English Bible with the Hebrew, Greek, and Latin copies.

TURNHOUT, a town of Belgium, in the province and 25 m. E. N. E. of the city of Antwerp; pop. about 15,000. It has a large church and extensive manufactories of linen, ticking, and lace. Leeches are reared here. In 1597 Maurice of Nassau routed the Spaniards here with the assistance of English troops, and compelled the fortress of Turnhout to surrender.

TURNING, the art of shaping wood, metal, or other hard substances into forms having usually curved, and most commonly circular outlines, and also of executing figures composed of curved lines upon plane or cylindrical surfaces, by means of appropriate tools and a machine called a lathe. Theodore of Samos, named by Pliny as the inventor of turning, may have originated the application of the process to the shaping of hard substances. The principle of turning is simple. A piece of wood or other hard substance being so fixed in a horizontal position by pivots or otherwise at its two ends as to be allowed to revolve freely about an axis in the direction of its length, and caused to turn rapidly in this manner, while a chisel or other cutting tool is approached to the piece so as to meet it as it advances on one side, and held firmly to it, the tool will cut away from the piece at that place all the material outside of a circle whose radius is the distance of its point from the axis of motion; thus it will give to the part a circular outline, and will reduce the diameter of this circle as its point is advanced further into the material. The tool being gradually moved along the length of the turning piece, it can thus be made to reduce successively the entire length to the circular outline, and, by cutting to different depths in different parts, to produce a turned piece marked with circular grooves, or other forms of curved surface. Outside circular turning is the most common, and is known as "centre work." With lathes of peculiar construction the work may be turned hollow, or bored or reamed, or turned both inside and out.—The most simple lathe for wood turning is called the pole lathe, made of two horizontal and parallel planks or beams, having a narrow space between them in which there are two uprights or puppets, one stationary, at the end of the bed, the other having a tenon passing through the space and secured by a wedge beneath, so as to be movable along the bed, to accommodate it to the length of the work. Near the upper end of each puppet, on the sides facing each other, is a conical iron or steel point, the two being in the same line. The piece is placed between the points, and the movable puppet brought up so that both points are pressed slightly into its ends; the line between these is the axis about which the piece will revolve. The fixed rest is placed conveniently for steadying the tool; while to turn the work, a groove being cut about it, usually at the left end, a stout cord or catgut is passed twice or oftener about the piece, then drawn straight and attached below to a treadle to which the workman's foot is applied, and above to an elastic pole or lath fixed at one end to the ceiling overhead, whence, probably, the name pole lath, or simply lath, or lathe. The workman holds the gouge or chisel to the work, and pressing down the treadle with his foot, the work is caused to spin rapidly round toward the point of the tool; and so long the latter takes effect. When the treadle, having come quite down, is released by the foot, the recoil of the lath carries back the cord and work in the reverse direction, and the tool does not cut. If it is required to turn the entire length of the piece, the cord must be shifted after a time to the finished part. This contrivance serves for ordinary wood turning; but on account of its imperfections, and especially the loss of time during the return or rising of the treadle, it is now little used. For light or fine work, the pole is often replaced by an elastic bow and string overhead, the cord giving the revolution being attached to the middle of the string. But the forms now more usual, and especially for heavy work, are: 1, the foot lathe, in which the treadle is by a link made to give motion to a crank, from a larger grooved wheel upon which a cord crosses in form of an 8 to a smaller grooved wheel or pulley fixed upon an axis at one end of the work, and giving motion to it; 2, the hand-wheel lathe, in which the power is applied by the action of one or two persons in turning a wheel, from which a band communicates movement to the axis and work; and 3, the power lathe for the heaviest work, moved by horses, water, or steam. Any wooden lathe, such as is used by turners in wood, is also distinguished as a bed lathe; while those of iron, for the best work in metals, are called bar lathes. In any form of lathe such as those now considered, the turning axis at one end of the work, to receive the power and give motion to the piece, in place of the simple point which can be used in the pole lathe, becomes indispensable. This axis is called the mandrel, and sometimes the "live spindle." The chucks, or contrivances fixed upon the end of the mandrel, are of various forms and construction, according to the kind of work they are intended to secure; the most common being the screw chuck, the hollow, drill, universal, concentric or die, and ring chuck, and the carrier and driver. The crowning improvement in the adaptation of the lathe to accuracy of work, and to that of all varieties, is attained through the invention of the slide rest, a carriage upon which the tool is supported, and by the construction of which it can be moved along the work by the machine or by hand, and at the same time advanced toward it, or set at any angle, as the character of the work may require.—In the cases thus far considered, there is but one axis or centre line of the work, that is, the centre line is a fixed direction throughout the process of cutting. But it is desirable to execute work in which the cutting in different parts or moments shall be in reference to two or more different axes through the solid or surface acted upon. A simple mode of effecting this is that of fixing the work successively with the different axes, and turning it at two or more operations. But practically, a far more complete and satisfactory result is attained, the forms executed being variable at the pleasure of the workman, by incorporating into the lathe devices which shift the place or direction of the single axis of motion, and in a defined manner and degree, while the work is rotated and the tool continually acting upon it. This species of turning, with a variable centre of the work at different moments, takes several names according to the devices employed or the particular results secured, as eccentric, geometric, oval, and rose-engine turning. Such work is said to be figure-turned; and the general principle is that of employing some form of chuck which shall give an oscillation or lateral movement to the axis or the work during its revolutions, so as to insure those deviations from a simple circular application of the cutter required for the intended form or figure. The chucks employed are designated as the eccentric, the geometric, the oval, or more properly elliptical, and as rosettes; while a straight line chuck can also be employed to cut plane surfaces or square work. In all work of this character, the amateur turner prides himself not only on the delicacy and elegance of his results, but quite as much on the difficulty of execution; and the value of turned work is often estimated by the degree in which it departs from the circular figure. For eccentric turning, a single eccentric chuck is one fixed upon a strong plate that can slide laterally within straight guides screwed upon the face of the mandrel, and which, having upon it a toothed wheel and click, is called the click plate; the slide, and the nose upon it for carrying the work, can be shifted into various positions out of centre, before applying the cutter. In the double eccentric chuck, a second plate or slide at the back of the first, and at right angles to it, can further vary the position of the axis. By aid of such a chuck, any required part of a disk can be brought in line with the centre of the mandrel, and holes bored in any part of it, or the edges hollowed out in curves of like or different radii, or polygons with curvilinear sides accurately produced. Ornamental work with these chucks consists mostly in the execution of variously curved figures on surfaces, without cutting away or changing the general outline, as in ornamenting ivory or fine work in wood. The ivory turner often employs a small instrument called an eccentric cutter, in which the tool revolves rapidly, being moved by a bow, and with which, by means of a single eccentric chuck and a separate adjustment of the cutter, involved figures like those ordinarily requiring the double eccentric chuck are produced. For geometric turning, a chuck of similar name is employed. In this, a wheel concentric with the mandrel, while the latter and the chuck revolve, gives, by means of a train of smaller wheels, an independent movement to the click plate and axis of the work. By varying the relative sizes of the wheels, by introducing an added wheel to cause the work to turn at the same time in a direction the reverse of that of the mandrel, and by changing the position of the tool, or giving movement at the same time to it, an almost infinite variety of curiously involved curved figures may be engraved or marked upon a plane surface to which motion is thus imparted under the point of the tool. By this machine some of the most perfect rosettes and other lathe work of bank notes, in the United States largely relied on as a means for the prevention of successful counterfeiting, are executed. The figures will vary with the construction of the machine; of which, save by actual inspection or model, no duplicate can be constructed. The geometric lathe of the American bank-note company of New York, the single one of its kind, is a foot lathe of highly complicated and perfect workmanship, the construction of which is said to have occupied three years' time, at a cost of $10,000. Elliptical turning is accomplished by means of the elliptical or oval chuck, in which the pressure of an eccentric ring, moving within and clasped by rubbers, is made to draw the slide out of centre alternately in the opposite directions, so that a stationary tool, held to a plate to which this movement is imparted during a revolution of the mandrel, will describe an ellipse instead of a circle; while the size, direction, and form of the ellipses can also be varied; and, as in the other forms of lathe here described, the micrometer screw may be introduced for determining the accuracy of proportions in the work.—Of the few machines which have been invented for turning irregular forms, in heavy or ordinary work, that of Blanchard is perhaps the best known and most successful. The principle of this machine is, that forms are turned by a pattern the exact shape of the object to be produced, which in every part of it is successively brought in contact with a small friction wheel; this wheel precisely regulates the motion of chisels arranged upon a cutting wheel acting on the rough block, so that as the friction wheel successively traverses every portion of the rotating pattern, the cutting wheel pares off the superabundant wood from end to end of the block, leaving a precise resemblance of the model. This remarkable machine, with modifications and improvements, is in use in the national armories as well as in England, and in various forms is applied to many operations in making musket stocks, such as cutting in the cavity for the lock, barrel, ramrod, butt plates, and mountings, comprising, together with the turning of the stock and barrel, 13 different machines. Besides gun stocks, it is also applied to a great variety of objects, such as busts, shoe lasts, handles, spokes, &c.—For further information respecting the tools and materials used in turning, see Holtzapffel's "Turning and Mechanical Manipulations" (3 vols., London, 1847–'52); and for the general subject, see the article "Lathe" in "Appletons' Dictionary of Machines," &c. (New York, 1857), and Valicourt's *Nouveau manuel complet du tourneur* (3 vols., Paris, 1848–'53).

TURNIP, a variety of *brassica campestris*, having two very marked forms: one with small root, but abundant stems and leaves, cultivated for its foliage and its oleiferous seeds, as rape; the other with a large, fleshy root, and comparatively little foliage, which is important in agriculture, and presents numerous subvarieties, all included under turnip. The genus *brassica*, of the family *cruciferæ*, is described and figured under another species (see MUSTARD), and the characters of *B. campestris* are given under RAPE. Both forms of the species, rape and turnip, are recognized in the wild state, though there the root of the turnip is comparatively small; when the two are sown together, they cross very freely and produce a great number of intermediate forms; the turnip form is spontaneous in Armenia, Russia, and Scandinavia, and is a weed of cultivation in various countries. There are two very distinct classes of turnips: 1, those with the root rounded and often broader than long, and usually lobed, hairy, and rough radical leaves; these are called common, round, and English turnips, and when turnip is used by cultivators without a prefix, this kind is intended; 2, those with larger, elongated, and more solid roots, and with the radical leaves smooth and covered with a bloom, like those of the cabbage; these are known as Swedish or Russian turnips (by English farmers as "Swedes"), and more generally as ruta-bagas (Sw. *rota-baggar*, root rams). There are yellow- and white-fleshed varieties in both classes, and the exterior is often more or less colored, from rose-purple to dark violet. All are biennials, at least in cultivation, and as their roots are not perfectly hardy, they must be stored for the winter. Turnips are cultivated as a garden and as a field crop. The early garden crop is of some of the quick-growing round kinds, such as the flat Dutch; the seeds must be sown as early as the soil can be worked, as hot weather soon makes the roots spongy. The main crop in garden or field is sown later; the ruta-baga sorts require a longer season, and are sown late in June or early in July, and other varieties, according to their requirements, until early in September, and in the southern states much later. In field culture, the ruta-bagas and other large kinds are sown in drills, and kept well cultivated, while the quicker growing, smaller sorts are often sown broadcast; good crops of these are frequently obtained by sowing the seed broadcast among Indian corn, just before that crop is cultivated for the last time. Turnips, when just germinated, suffer much from the attacks of the small flea beetle (*haltica*), which are often very disastrous (see TURNIP FLY); the only remedy is to use an abundance of seed, and to sprinkle the young plants copiously with slaked lime or ashes. These, with other roots, do not occupy the important place in our agriculture that they do in that of England, our abundance of Indian corn rendering them less a necessity as winter food for animals; still their value as affording a variety is becoming more appreciated, and their culture is rapidly increasing. The ruta-baga sorts, though costing more labor to raise, are the most nutritious and the best keepers; they are preserved in cool cellars or in heaps in the open ground, the roots being stacked in pyramidal piles and covered with sufficient straw and earth to prevent severe freezing. Turnips are most valued as food for cattle and sheep; they are sliced and sometimes pulped in a machine for the purpose. In England, and in some parts of this country, turnips are fed to sheep in the field; a space is enclosed with hurdles or movable fences, and when the sheep have cleared off the turnips from this portion, the hurdles are removed to enclose another section; for swine and horses they are less valued than other roots. The amount of nutritive matter in turnips is very small; the common kinds have from 90 to 92 and the ruta-bagas about 87 per cent. of water; the albuminoids are from 1 to 1·6 per cent., and the carbohydrates vary from 5 per cent. in the common to 9 per cent. in the ruta-bagas. The leading garden sorts, besides the white Dutch already mentioned as the earliest, are: the red-top strap-leaved, the best of the flat kinds; the cow-horn, a foot long and 3 in. through, the half which grows above ground being green—also grown as a field crop; and yellow Aberdeen, purplish above and yellow below, with a yellow flesh. The white French, one of the ruta-baga kinds, has the root all below ground, is twice as long as thick, of medium size, and keeps well; though called French, its origin is unknown; it is superior to all others for the table, unless it be the sweet German, which differs only in being broader than long; both are probably strains of the same variety, differing in the shape of the root. The Teltow is a great favorite with the Germans; the root is about 3 in. long and an inch thick, with a very piquant flavor which resides in the rind;



Varieties of the Turnip. 1. Red-top Strap Leaf. 2. Cow-horn. 3. Long White French. 4. Ruta-baga.

it is valued for flavoring soups and stews. In England the list of ruta-bagas or Swedes for field culture is long, and each year adds new varieties; in this country varieties known as the improved American, Skirving's purple-top, Carter's, and Laing's ruta-bagas are the principal sorts cultivated.

TURNIP FLY, a name given to several insects of different orders, but especially to the small chrysomelian beetles of the genus *haltica* (Illig.), which attack the turnip in its various parts and stages of growth. In the genus *haltica* (Gr. ἁλτικός, skilled in leaping) the body is very convex above, oval, with short thorax and wide head; antennæ slender; hind thighs very thick and formed for leaping; surface of the body generally smooth and shining, and often prettily colored; claws notched and hooked, enabling them to keep firm hold of the leaves of plants on which they feed, especially the cruciferous vegetables, to which they are often very injurious. They are all very small, the largest not more than two lines long and one line wide; most are shining green, tinged with brown or yellowish. The turnip fly of England is the *H. nemorum* (Illig.); it devours the seed leaves of the turnip as they appear above the ground, continuing its ravages all summer; in winter it conceals itself in some dry and sheltered place, laying its eggs in spring on the leaves; the larvæ eat the soft pulpy substance, making little galleries in which they undergo their changes, and in this way are as injurious as the full-grown beetles; they are slender grubs, tapering at each end, with six legs, and become perfect insects in a few weeks, a constant succession occurring through the summer. The loss to the turnip crop from their ravages is sometimes very large. (See Turnip.) The *H. striolata* (Fabr.), the wavy-striped flea beetle of the United States, much resembles the preceding; it is less than $\frac{1}{10}$ of an inch long, shining black, with a broad, wavy, buff stripe on each wing cover, and the knees and feet reddish yellow; it is abundant on the seed leaves of the turnip and other plants early in May, in some seasons threatening to be almost as injurious as the European insect. —Among the lepidoptera, the *pontia oleracea* (Harris), potherb or white butterfly, is often called turnip fly. The wings are white or yellowish, dusky near the body; back black, and antennæ blackish with narrow white rings; the expanse of wings about 2 in. Toward the beginning of June it may be seen fluttering over turnip and cabbage beds for the purpose of attaching three or four of its eggs to the under side of the leaves; the eggs are yellowish, pear-shaped, ribbed longitudinally, and $\frac{1}{15}$ of an inch long; they are hatched in about 10 days, attain their full size of $1\frac{1}{4}$ in. in three weeks, when they are pale green, and eat irregular holes in any part of the leaf; they pass a chrysalis state of 11 days, suspended by silken threads attached to the hind feet and fore part of the body in some protected place. They are again abundant toward the beginning of August, laying eggs for a second brood, the chrysalids from which survive the winter, coming out perfect insects in May or June; the chrysalis is four fifths of an inch long. The larvæ are eaten by titmice and other insectivorous birds; the chrysalids can be collected on boards placed for them near the ground, and the butterflies are easily caught in bag nets, as they fly low and lazily. This species is rarely found S. of the latitude of New Hampshire.—Some dipterous insects, as the flower flies (*anthomyiadæ*), in the larva state infest the roots of turnips, &c., eating also the pulpy parts of the leaves and stems.

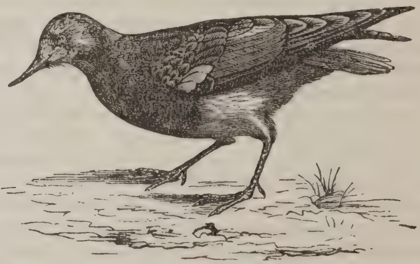
English Turnip Fly (Haltica nemorum).

White Butterfly (Pontia oleracea).

TURNSOLE. See Heliotrope.

TURNSPIT. See Terrier.

TURNSTONE, a wading bird of the oyster-catcher family (*hæmatopodidæ*) and genus *strepsilas* (Illig.), so named from its turning over by its strong bill the stones and weeds along the margins of the sea and of lakes and rivers in search of insects, mollusks, and crustaceans. The only well characterized species, *S. interpres* (Illig.), is about 9 in. long and 18 in. in alar extent; above it is irregularly variegated with black, dark rufous, and white; head and



Turnstone (Strepsilas interpres).

neck white above, with numerous spots and stripes of brownish black; in front of eyes and on throat white, usually bordered with black; lower parts, back, rump, and under wing coverts, white; quills brownish black, with white shafts; tail white at base and tip, with terminal half brownish black; conspicuous white bar on wings, bill black, and legs orange. The bill is shorter than the head, compressed, obtusely pointed, and slightly bent upward at tip; legs moderate and stout, with tarsi scaled in front; toes short and not webbed, the hind one touching the ground; wings long, the first quill longest; tail moderate and rounded. It is generally seen in small flocks of five or six, sometimes in company with various sandpipers; it is not at all shy, and emits a loud whistling note during flight; in its spring and summer dress it is very handsome; the eggs are four, 1⅓ by 1¼ in., pale yellowish green with a few black lines and irregular patches of brownish red. It is found all over the world.

TURNVEREIN. See GYMNASTICS.

TURÓCZ, a N. W. county of Hungary, bordering on the counties of Trentschin, Árva, Liptó, Zólyom, Bars, and Neutra; area, 444 sq. m.; pop. in 1870, 45,346, almost all Slovaks. It is traversed by the Carpathian mountains, and drained by the Waag and its affluent the Turócz. It abounds in rich pastures, meadows, and forests. Capital, Szent-Márton.

TURPENTINE, a term applied to several oleoresins which exude from coniferous trees, and also from the *pistacia terebinthus*, the tree called by the Greeks τερέβινθος, which furnished the principal variety known to the ancients. Of commercial turpentine there are several varieties, which consist of a resin more or less dissolved in a volatile oil, called oil of turpentine. American turpentine is chiefly obtained from the *pinus australis* or "long-leaved" pine, which is abundant on the coast of the Carolinas and Georgia; it is also obtained from "old field" pine or *pinus tæda;* the largest quantity is produced in North Carolina. Canada turpentine, called also Canada balsam and balsam of fir, is the product of *abies balsamea* or balm of Gilead fir, a small tree which grows in Canada and the state of Maine. The German turpentine is principally derived from the Scotch fir, *pinus sylvestris;* French or Bordeaux turpentine is obtained from *pinus maritima*, which grows in southern Europe and along the Mediterranean coast; Strasburg turpentine from the silver fir, *abies pectinata*, and from spruce fir, *A. excelsa.* That from silver fir is quite liquid, having the odor of lemons and a sharp, bitter taste; that from spruce fir has a strong balsamic odor and a sweetish, aromatic taste. Venice turpentine is obtained from the larch, *larix Europæa;* it is a ropy liquid, of a transparent brownish or greenish color and a bitter taste. Hungarian and Carpathian turpentines are from *pinus pumilio* and *pinus cembra.* Cyprian, Syrian, or Scio turpentine is obtained in Scio from *pistacia terebinthus*, and in Syria from *pistacia vera*, which is also the tree that furnishes pistachio nuts; it has the odor of fennel and an aromatic taste like mastic.—When exposed to the air, turpentine slowly hardens, partly from evaporation of the oil, and partly from oxidation. It softens and liquefies by heating, takes fire readily, and burns with a dense smoky flame. It is completely soluble in alcohol and ether. On boiling with water the volatile oil passes off with the steam, while the resin remains intimately mixed with a small quantity of oil and water, forming a dingy, turbid mass called "boiled turpentine." At a stronger heat the water and remaining portion of oil are expelled, and colophony remains, as a transparent resin, more or less colored. Colophony was formerly regarded as a mixture of two isomeric acid resins, pinic and sylvic acids; but recent investigations of Maly have shown it to consist mainly of abietic anhydride, $C_{14}H_{62}O_4$, which when treated with aqueous alcohol takes up water and is converted into abietic acid, $C_{14}H_{64}O_5$.—The turpentines are the sources of the oil of turpentine of commerce, which constitutes from 10 to 25 per cent. of crude turpentine. The remainder is principally rosin, from which the turpentine is distilled. (See ROSIN, and TURPENTINE, OIL OF.)

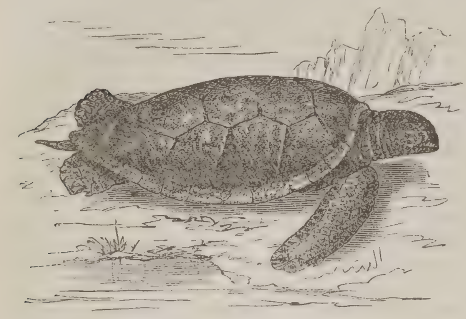
TURPENTINE, Oil of, called also spirits of turpentine, the volatile oil distilled from turpentine, and naturally contained in the wood, bark, and leaves of the trees from which it is obtained. It is prepared by distilling the crude turpentine either alone or with water. It was formerly supposed that all the oils thus obtained, which have the formula $C_{10}H_{16}$, had the same properties; but recent investigations, particularly by Berthelot, show that the oils obtained from different sources possess different physical (particularly optical) properties, and that they are generally mixtures of two or more isomeric or polymeric hydrocarbons; and furthermore, that the modifications are often produced by heat and chemical reagents during the distillation or purification of the oil. But they all belong to the class of terpenes, of which the volatile oils of aurantiaceous plants, as the orange and lemon, are members, as well as the oils of caraway, juniper, and lavender, which are isomeric; also the oils of copaiba and cubebs, which are polymeric ($C_{20}H_{32}$). These terpenes are members of a large group, designated by Berthelot as camphenes, which also have the formula $C_{10}H_{16}$. The several varieties of turpentine oil, when purified by repeated rectification with water, are colorless mobile liquids having a peculiar aromatic odor. They are insoluble in water, slightly soluble in aqueous alcohol, but dissolve in all proportions in absolute alcohol, ether, and bisulphide of carbon. They dissolve iodine, sulphur, and phosphorus, and also fixed oils and resins, on which account they are used for mixing with paints and for making varnishes. The oils of different origin vary slightly as to specific gravity and boiling point, but more particularly in regard to their optical rotatory power; but many of them are derived from several sources, and as before remarked vary when of the same origin on account of different modes of preparation. French turpentine oil, obtained from French or Bordeaux turpentine, consists of a hydrocarbon, $C_{10}H_{16}$, called by Berthelot terebenthene. It cannot be readily obtained from the commercial oil, which is too much contaminated with products of transformation, but may be obtained pure by treating French turpentine with an alkaline carbonate, and distilling it first over a water bath and then in a vacuum, by which transformation by heat or reagents is avoided. Terebenthene obtained in this way has a constant specific gravity of 0·864, a boiling point of 321·8° F., and a rotatory power of —43·3°. (See LIGHT, OPTICS, and saccharimetry in the article SUGAR.) This oil also contains an isomeric hydrocarbon, terepentilene, boiling below 356° F., and also a polymeric oil, parterebenthene, which boils at about 482°. The principal oil contained in English turpentine is australene, or austraterebenthene, having the same specific gravity and boiling point as the French oil terebenthene, but an optical rotatory power of +21·5°. The English oil also contains, according to Berthelot, an isomeric body called australene. Both the English and French oils, before their constituents are separated, possess rather less rotatory power. Venetian oil of turpentine has a rotatory power of —5·2°. All these oils possess the common property of absorbing oxygen from the air and ultimately becoming resinous, at the same time producing carbonic, acetic, and formic acids. In this gradual oxidation ozone is produced, as it is more rapidly by dipping a warm glass rod in a jar filled with vapor of turpentine; and turpentine oil exposed for some time to the sun's rays contains oxygen and ozone in solution. A paper soaked in oil of turpentine and immersed in a jar of chlorine takes fire, producing a dense black smoke and white fumes of hydrochloric acid. When treated with excess of iodine the combination takes place explosively. Turpentine oil is violently acted upon by nitric acid, often taking fire, producing nitro-benzene.—Oil of turpentine, besides being used in making varnishes, is, on account of its solvent action generally on oils and resins insoluble in water, used for discharging such substances from cloth, rags, &c. It is one of the most energetic of volatile oils. Its vapor is quickly destructive to plants and to many insects. It acts more powerfully on the lower animals than on man, easily blistering the skin of the horse. It is used in medicine as a diuretic and anthelmintic, and as a stimulant to the mucous membranes of the bowels and genito-urinary organs. It is often of great benefit in the ulcerated condition of the small intestines consequent upon typhoid fever, and also in diarrhœas. It also possesses many interesting chemical characteristics, the study of which has been of great advantage to the progress of theoretical chemistry.

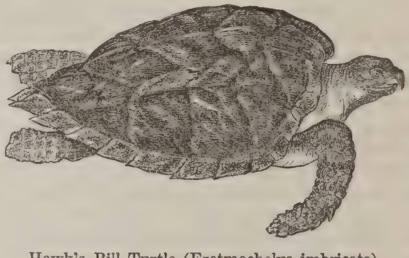
TURPIN, Tulpin, or Tilpin, archbishop of Rheims, a friend and companion of Charlemagne, died Sept. 2, 800. He was originally a Benedictine monk of the convent of St. Denis, and was made archbishop about 753. His name is prefixed to a Latin chronicle, which relates the expedition of Charlemagne against the Saracens of Spain and the fight of Roncesvalles. Turpin's authorship of the chronicle is disputed, though Pope Calixtus II. in 1122 declared it to be authentic. The work is among the earliest productions relating to the events of Charlemagne's reign, and from it the tales of chivalry of the middle ages were largely taken. It was translated from Latin into French in 1206 by a clerk of Renaud, count of Boulogne. The original was first printed in the collection of Schardius (fol., Frankfort, 1566). The best editions are by Ciampi (Florence, 1822) and by Reiffenberg in *Chronique de Philippe Mouskes* (2 vols., Brussels, 1836).—See Gaston Paris, *De Pseudo-Turpino* (Paris, 1865).

TURQUOISE, a native hydrated phosphate of aluminum, found in the mountains near Nishapur, in Khorasan, Persia, and much valued as a gem. It is called by the Persians *birusa*, and is probably the *callais* of Pliny. An inferior variety is also found at Jordansmühle in Silesia, and at Oelsnitz in Saxony. Major Macdonald discovered in Arabia Petræa, near Mt. Sinai, a variety of turquoise in a layer of red sandstone; it is darker and said to be of a finer blue than the Persian turquoise, but unfortunately it changes color, especially under the wheel of the lapidary. Persian turquoise has the chemical composition represented by the formula $2Al_2O_3,P_2O_5,5H_2O$; it is uniform and stalactitic in structure, of hardness 6 on a scale of 10; sp. gr. 2·6 to 2·8; color a peculiar bluish green to azure-blue and white, slightly translucent to opaque, with small conchoidal fracture. Specimens of a fine blue are much the most highly prized. When heated, the turquoise decrepitates strongly, gives off water, and, if colored, turns black. It tinges the blowpipe flame green, and with fluxes gives reactions of iron and copper. An analysis by Hermann of a blue oriental turquoise gave 28·9 of phosphoric anhydride, 47·45 alumina, 2·02 cupric oxide, 1·1 ferric oxide, 0·5 manganic oxide, 1·85 lime, and 18·18 water. The turquoise is much used in oriental countries for ornamenting harness, girdles, swords, amulets, and charms, and is believed to have the power of protecting its wearer against contagion, or, when he is affected with disease, of changing color and becoming pale. Several antique cameos and intaglios cut in turquoise are in the Vatican at Rome. Fragments of the gem, which appear to have been parts of amulets, are often met with in Egyptian ruins. The shah of Persia is supposed to have in his possession all the finest gems in existence, as only those of inferior quality are allowed to be taken away.

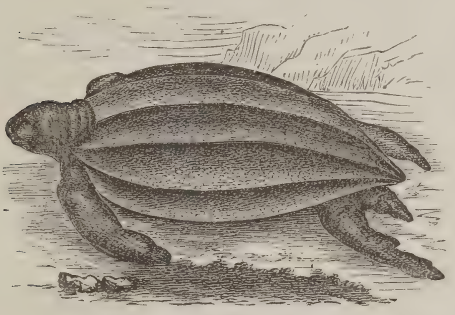
TURRETIN, or **Turretini. I. François,** a Swiss theologian, born in Geneva, Oct. 17, 1623, died there, Sept. 28, 1687. He visited Holland and France in his youth, studied under Spanheim, Morus, and Diodati, and on his return in 1647 was ordained pastor at Geneva. In 1650 he removed to Leyden, but in 1653 was recalled to Geneva to become professor of theology. His *Institutiones Theologiæ Elenchticæ* (Geneva, 1679–'85) is one of the clearest statements of Calvinistic doctrines. His complete works were published at Geneva in 1688, in 4 vols. 4to. **II. Jean Alphonse,** son of the preceding, born in Geneva, Aug. 13, 1671, died there, May 1, 1737. He was professor of ecclesiastical history at Geneva, and published *Écrits sur la vérité de la religion judaïque et de la religion chrétienne* (5 vols. 8vo), an abridgment of ecclesiastical history, &c.

TURTLE, the name popularly applied to the marine chelonian reptiles, equivalent to the suborder *chelonii* (Oppel), including the families *sphargididæ* and *chelonioidæ;* in these the dermal ossification is imperfect, and the limbs preserve through life the fingers undivided, as in the embryos of the higher families of the suborder *amydæ* or tortoises. For the characters of the order see TESTUDINATA. The word turtle in Saxon meant turtle dove, a bird and not a reptile; and the English word had the same signification until the discovery of America, when sailors gave the name of turtle or turkle to the marine chelonians of the West Indies. As distinguished from the *amydæ* (see TORTOISE), the turtles have the limbs converted into large, flattened, fin-like organs, the toes completely concealed by a common skin, the anterior pair always considerably longer than the posterior, and both frequently furnished with one or two nails on the outer margin, sometimes disappearing with age; the body is flattened to facilitate their progress through the water; swimming is performed almost entirely by the anterior limbs, the posterior moving independently and used chiefly to balance the body and guide it; the anterior are raised and depressed together very much like wings, and have a free sweep up and down and forward and backward; on land they move slowly and awkwardly by means of the front limbs, projecting them forward and dragging the body up to them, assisted greatly by the nails; the bulk of the body is forward, where are the principal muscular masses. The head and limbs cannot be retracted under the shield as in the tortoises, and the plastron is less perfectly ossified and connected with the carapace; the ribs are narrowed toward the end, and the spaces between them at this point and the bony plates of the plastron are separated by intervals filled up by cartilage; the head is flattened above, protected by large plates; the jaws are strong and firmly articulated, horny, very sharp and beak-like, and the eyes large and prominent; the head is so placed on the neck as to allow the nostrils to be easily raised above the surface, their openings being closed by a fleshy valve. Much sea water is swallowed with their food, and when the former is of necessity regurgitated the latter is retained by the numerous horny processes, pointing backward, in the œsophagus. The very young are longer in proportion to their width, and grow broader. Though lower than the tortoises, the turtles exhibit features resembling those of birds in the form of the anterior limbs, the mode of locomotion, the preponderance of the fore part of the body, bill-like jaws, and overlapping epidermic appendages. All are marine, excellent swimmers, and rarely approach the shore except to deposit their eggs; some feed entirely on sea weeds, but a few eat mollusks, crustaceans, and other aquatic animals; they are generally timid, and make but little resistance, though they are more bold and regardless of danger in the pairing season. The flesh of the herbivorous species is a wholesome food, and much sought after by epicures, while that of the carnivorous is disagreeable if not positively injurious; the callipee, or under part of the breast and abdomen, is considered the choicest part; the liver and fat are also much esteemed. They come on shore toward the end of spring to lay their eggs on the sandy beaches above high-water mark; they generally select desert islands or keys, and a still moonlight night; they dig a trench in the sand with their hind feet about 1½ ft. deep, and deposit therein about 100 eggs at each of three layings, with an interval of two or three weeks between them; the eggs are lightly covered with sand, and left to be hatched by the heat of the sun; if undisturbed, they return to the same shore year after year. They are caught on the shore, and turned on their backs, a position from which they cannot escape, owing to the flatness and width of the shell; they are harpooned and taken in nets in the water, and in the Indian seas are captured by means of the *remora.* (See SUCKING FISH.)—In the *chelonioidæ* the body is widest about midway, and the vertebral column descends continuously and gently to the tail; the shoulders and hind limbs are better protected than in the other family; the shield is more or less heart-shaped, with the posterior angle not prolonged into a point extending far over the tail; all the genera are represented on the coast of the United States, and are far less rapid swimmers than the *sphargididæ.* The latter family has only the single genus *sphargis* (Merrem), showing well the inequality of the natural groups called families; the body is more conical than in the other turtles, the carapace leaving the hind legs as well as the shoulders and neck much exposed from its great contraction behind and in front; the lower parts are equally unprotected by the plastron, this with the carapace forming little more than a wide girdle around the thorax and abdomen; the skeleton is light, the paddles large and free, and everything seems arranged for rapid and long continued voyages.—The green turtle (*chelonia midas*, Schw.), sometimes attaining a length of 5 or 6 ft. and a weight of 5 or 6 cwt., received its name from the color of the delicate fat which enriches the soup and other dishes of a course of turtle. It has a short and rounded snout, and jaws acting like straight-edged shears cutting from behind forward, the upper slightly notched, the lower with a deeply serrated margin and a hook in front; shell smooth, with 13 plates, 5 vertebral and 8 lateral, not imbricated, slightly notched and serrated behind, and with 25 marginal plates; anterior limbs rounded at shoulder, covered with a tough skin and a few small plates; forearm and hand with large plates on the anterior border, smaller ones elsewhere, and an extensile fold of skin along the posterior margin; hind limbs short and flattened, covered with small plates and a larger fold of skin on the margin; a single nail to each limb; the shell is light brown, with darker lines and blotches, and sometimes with a greenish tinge; below pale yellowish white. It is abundant in the tropical waters of America, whence great numbers are carried alive to the northern states and to Europe; the West Indies are its headquarters, whence it wanders to the gulf of Mexico and the coasts of Guiana and Brazil; it is rarely found above lat. 34° N. on the Atlantic coast, and never on the shores of Europe; the Tortugas islands are a favorite resort. It browses on the turtle grass (*zostera marina*), eating the succulent part nearest the root, the rest rising to the surface and disclosing the feeding grounds to the practised eye; in confinement it will eat and grow fat upon purslane (*portulaca oleracea*); numbers are kept for a long time in pens or crawls filled at every tide. It is often seen many hundred miles from land, and is easily taken when asleep on the surface; its capture gives employment to many and food to thousands in the West Indies. (For an account of other methods of taking them, and of the manner in which the eggs are laid, see Audubon's "Ornithological Biography," vol. ii., pp. 370–'76, Boston, 1835.) During the actual laying of the eggs nothing can disturb their labors; they are hatched in eight or nine weeks. The flesh is exceedingly delicate, and wholesome in moderate quantities; the eggs of this and of all the species are also considered a delicacy. In the young the carapace is relatively narrower, and the colors of the adults vary much. As in all the species, the eggs are dropped one by one, and disposed in regular layers, during a period of about 20 minutes; they are round, 2 to 3 in. in diameter, with the external membrane flexible, very white, and containing a considerable quantity of calcareous matter; the shell of the young is soft, and affords but little protection.—The loggerhead turtle (*thalassochelys caouana*, Fitz.) has the body very wide across the shoulders; the head very large and flat, with wide mouth, the upper jaw nearly straight, and the lower hooked; shell smooth, with a keel along the median line, and a crescentic notch in the posterior border; the plates are thin and flexible, 5 vertebral and 10 lateral, not imbricated, and the marginal plates 25; each limb has two nails, corresponding to the first two fingers; the color above is light brown, sometimes with an olive tinge and often bordered with dirty yellowish; and the shield, as in the other turtles, is frequently more or less covered with barnacles, serpulæ, and other parasites. It has an extensive range on the American coast of the Atlantic, from Virginia to Brazil, and probably on the shores of Europe and in the Mediterranean; it is more common than the green turtle, and grows to 15 or 16 cwt.; it is voracious, feeding principally on mollusks, being able to crush with its powerful jaws the strongest shells; the flesh of the young is sometimes eaten, but that of the old is rank and tough; the scales are of little value, and even the eggs have a musky flavor; it is taken only for the considerable quantity of excellent burning oil which it furnishes.—The hawk's bill or imbricated turtle (*eretmochelys imbricata*, Fitz.) has a low and rather wide head, a long and narrow mouth, the upper jaw prolonged and hooked like the beak of a hawk, the lower jaw with a smaller hook, and both with serrated margins; the shell is slightly keeled, flattened and serrated behind, with five vertebral and eight lateral plates strongly imbricated or overlapping like the scales of a fish; the plastron has


Green Turtle (Chelonia midas).


Hawk's Bill Turtle (Eretmochelys imbricata).

two keels, more or less worn off by age; there are two nails to each limb; anterior limbs very long and wing-like; the head is protected by 14 scales; the tail is conical, not extending beyond the shell. The color is yellowish above, marbled with rich chestnut brown, and yellowish white below; in the young there is a black spot on the four posterior pairs of plates. It is found in the West Indies, the gulf of Mexico, on the coasts of Guiana and Brazil, and has even strayed to the Mediterranean; the *E. squamata* (Ag.) is found in the Pacific and Indian oceans, the best being taken about the Moluccas and Papua. The food consists of sea weeds, crabs, mollusks, and fishes; in confinement it is fiercer than the preceding two; it rarely grows more than 3 ft. in length; its flesh is indifferent, and it is said unwholesome, though the eggs are good, and the species is sought after only for its beautiful horny plates, which constitute the tortoise shell of commerce. These are not considered of value unless from an animal weighing at least 160 lbs., as otherwise they are too thin; 15 lbs. of shell from a single one is a large amount, and yet in animals of the same size the imbricated would be worth 10 times as much as the green turtle. Singapore and Canton are the great marts for tortoise shell. It was consumed in large quantities in ancient Rome, even the door posts of the rich being inlaid with it; the carapace was used as a cradle and a bath tub for children, and as a shield for warriors.—The leathery or trunk turtle (*sphargis coriacea*, Merr.) is so named from having the carapace overlaid by a leathery skin instead of horny plates, smooth in the adult, but tuberculated in the young, and with seven longitudinal ridges; the head is large, narrowed in front of eyes, with small and circular nostrils, and large eyes with lids opening nearly vertically; jaws very strong and sharp-edged, the upper with three notches, the hook of the lower shutting into the central one; neck short and very thick; anterior limbs twice as long as the hind ones, the former falcate, the latter the widest; tail sharp, compressed on the sides, and not extending beyond the shell; the color is dark brown above, with lighter spots along the ridges. It is the largest of the turtles, attaining a length of 8 ft. and a weight of nearly a ton; its food consists of mollusks, crustaceans, fish, sea urchins, and marine plants; its flesh is of no value, but its shell has been used along the Mediterranean for making small boats, drinking troughs for animals, and children's bath tubs. It is found on both sides of the Atlantic, especially in the tropics, coming north as far as Massachusetts bay, and following the Gulf stream across the Atlantic to the coasts of Europe and the Mediterranean; those of E. Asia and S. Africa may perhaps be a different species; none of this genus have nails on the limbs. It was known to the ancients.—The marine species have great tenacity of life under mutilation and deprivation of food. Turtles are found as far back as the Jurassic period, continued through the cretaceous, becoming more abundant and advancing further north than at the present day, though they were not so large as the existing species; in the limited strata of the eocene clay of the island of Sheppey more species have been discovered than now exist; large species have been found in the tertiary of South Carolina and the greensand of New Jersey, of several genera.



Trunk Turtle (Sphargis coriacea).

TURTLE DOVE, the common name of several small pigeons, especially of the genera *turtur* and *œna*, characterized by a smaller size than the domestic pigeon, weaker bill, longer toes (the inner exceeding the outer), and a longer and wedge-shaped tail; they are both arboreal and terrestrial, feeding on the ground, but roosting and nesting in trees. The word turtle signified a dove until the discovery of America, when it was applied to the marine tortoises. In the genus *turtur* (Selby) the bill is slender and straight, with the tip slightly arched and acute; wings long, the second and third quills the longest; tail moderate, rounded or even; tarsi almost as long as the middle toe, for the most part naked, and the toes long and slender. There are more than a dozen species, found in various parts of Europe, India, and Africa, in woods and jungles, making their presence known by their pleasant cooing; from Europe they migrate to the south in winter; they are generally seen in flocks of about 20, in open cultivated districts, feeding on grain, seeds of grass, &c.; the nest is made in thick woods, of small twigs loosely put together, and the eggs are two. The common European turtle dove (*T. auritus*, Selby) is 11 in. long; the head, neck, breast, and back are wood-brown tinged with pearl-gray; a patch of black feathers margined with white on each side of the neck; scapulars and wing coverts black, shading into grayish, and edged with buff; lower parts white, as are the tips of the tail feathers except the two middle ones. It arrives in temperate Europe in May, leaving at the end of summer; it is found also in Asia and Africa, and is only a rare visitor to Great Britain; it has been supposed to be the origin of some of the smaller partly domestic varieties which are kept only in aviaries. The collared turtle dove (*T.*

Collared Turtle Dove (Turtur risorius).

Carolina Turtle Dove (Zenaidura Carolinensis).

risorius, Selby) is 10 in. long; the general colors are different shades of pale wood-brown, with even paler edgings, tinged with vinaceous on the under parts, and with a half collar of black on the hind neck. It is found wild in most parts of Africa, but is now widely distributed as a cage bird. If left at liberty, it flies away, and does not seem capable of domestication like the common pigeon; in warm climates seven or eight broods are raised in a season. It is doubtless the turtle of the Scriptures, and is still numerous in Egypt and Asia Minor, deriving its specific name from a fancied resemblance of its cooing to a human laugh.—In the genus *œna* (Selby) the bill is moderate and very slender, the wings long with the first three quills nearly equal and longest, and the tail of 12 feathers, very long and wedge-shaped, with the two middle feathers narrowed. The Cape turtle dove (*Œ. Capensis*, Selby) is 10 in. long, of which the tail is more than half, the closed wings reaching to about one third the length of the tail; in the male the forehead, chin, throat, and upper breast are intense black; crown, sides of neck and body, and lesser wing coverts pale French gray; middle of abdomen white; back pale brown; wings deeper brown, with a few metallic purple spots; two black bars on the rump; middle tail feathers grayish brown, with terminal half black, and the rest bluish gray with a broad black band near the tip; bill and feet yellow. It is seen on trees bordering the rivers of S. Africa, making its nest in low bushes.—In North America is found the Carolina turtle dove (*zenaidura Carolinensis*, Bonap.), about 12¾ in. long and 17½ in. in alar extent; the bill is weak and black; the wings pointed, with the second quill the longest, and the first and third nearly equal; tail longer than the wings, much graduated and wedge-shaped, and of 14 feathers; though much smaller, it resembles the passenger or wild pigeon in its lengthened tail. It is bluish above, mixed with light brownish olive, the former purest on the crown, wings, and upper surface of tail; the rest of head, sides of neck, and under parts generally light brownish red, purplish on breast, becoming brownish yellow behind; patch of metallic purplish on the sides of neck; sides of body and under surface of wings light blue; black spots on wings, and patch of same below ears; tail above with a subterminal black bar and light tip; feet yellow; the female is smaller and less reddish below. It is found all over the United States and in Cuba, and from ocean to ocean; it is rare in the British Atlantic provinces, though common on the Columbia river. The flight is extremely rapid and long continued, but not at a great height, and accompanied by a whistling noise; it walks with ease and grace, and runs swiftly; it seldom bathes, but drinks by swallowing water in long draughts, with the bill deeply immersed; it is rather shy, and difficult to shoot from the rapid flight; 200 or 300 constitute a large flock, which scatter over so large a space that it is not easy to kill more than one at a shot, except in winter when they come near farm houses; the flesh is excellent, and great numbers are killed in the southern states in winter. In Louisiana they begin to lay by the last of March, but in New England not before the middle of May; the nest is made in any kind of tree, and is very loosely constructed; it breeds in aviaries, raising several broods in a season. The eggs are two, 1⅛ by ¾ in., equally rounded at both ends, and pure white.—None of the turtle doves commit serious depredations in the fields of grain, as they are rather gleaners than reapers. The family characters have been given under Pigeon.

TUSCALOOSA, a W. county of Alabama, intersected by the Black Warrior and Sipsey rivers; area, 1,450 sq. m.; pop. in 1870, 20,081, of whom 8,294 were colored. The surface is hilly and the soil highly fertile. Iron ore, bituminous coal, and carboniferous limestone are found. The Alabama and Chattanooga railroad traverses it. The chief productions in 1870 were 7,551 bushels of wheat, 343,569 of Indian corn, 7,718 of oats, 6,951 of peas and beans, 41,262 of sweet potatoes, 120,010 lbs. of butter, and 6,458 bales of cotton. There were 1,245 horses, 1,378 mules and asses, 2,768 milch cows, 5,418 other cattle, 6,139 sheep, and 11,046 swine; 2 manufactories of cotton goods, 1 of iron castings, 2 of stone and earthen ware, 2 flour mills, 2 tanneries, 2 currying establishments, and 1 saw mill. Capital, Tuscaloosa.

TUSCALOOSA, a city of Alabama, capital of Tuscaloosa co., and of the state from 1826 to 1846, on the left bank of the Black Warrior river, at the head of steamboat navigation, 90 m. N. W. of Montgomery; pop. in 1870, 1,689, of whom 787 were colored; in 1875, about 2,500. The Alabama and Chattanooga railroad passes within a mile. The streets are wide and well shaded. A mile above the town are the grounds of the university of Alabama. The buildings, with their contents, were burned in 1865, and have been only partially restored. In 1874–'5 the university had eight professors, besides other officers, 74 students, and a library of 4,000 volumes. The Alabama insane hospital, about a mile beyond the university, has a front of 780 ft., with extensive outbuildings and grounds. It was opened in 1860, and now has about 360 inmates. Situated at the head of the cotton-planting and at the foot of the mineral region of Alabama, Tuscaloosa is the centre of trade for a district containing rich resources, as yet but imperfectly developed. It has a considerable trade in cotton, wheat, coal, &c. There are flour mills, a shoe and leather manufactory, and an extensive cotton factory in the vicinity. It has a national bank with a capital of $56,000, two weekly newspapers, and one male and four female seminaries, one of the latter being in the old state capitol. There are five churches: Baptist, Episcopal, Methodist, Presbyterian, and Roman Catholic. The city, county, and river take their name from the Indian chief Tuscaloosa ("black warrior"), who was defeated by De Soto in the bloody battle of Mavilla, Oct. 18, 1540.

TUSCANY (It. *Toscana*), a division of central Italy, bordering on the Mediterranean, and including the provinces of Arezzo, Florence, Grosseto, Leghorn with the island of Elba, Lucca, Massa e Carrara, Pisa, and Siena; area, 9,287 sq. m.; pop. in 1872, 2,142,525. It is divided from Piacenza, Parma, and Reggio by the Ligurian Apennines, and from Modena and the Romagna by the Tuscan Apennines, beginning with Monte Cimone and extending S. E. about 80 m. (See APENNINES.) The principal rivers, besides the Tiber, the head waters of which are in the province of Arezzo, are the Arno, Cecina, and Ombrone, all flowing into the Mediterranean. The coast from the mouth of the Arno to the border of Latium is occasionally bold, but generally low and swampy, and on the south are several bays. The climate is severe in the mountains, but in the valleys vegetation is hardly interrupted; and excepting in the marshy regions, which in autumn are deserted (see MAREMME), the country is very salubrious. Grain, wine, silk, olives and olive oil, and cheese are produced in great abundance; sheep and pigs and large asses abound; woollen and silk goods and many other articles are made. The purest Italian is spoken in Tuscany, and education is advanced. The principal seaport is Leghorn. Capital, Florence.—The ancient Etruria or Tuscia comprised the present division of Tuscany and adjoining territories to the east and southeast. (See ETRURIA.) After the fall of the Roman empire it passed from the Goths to the Lombards, and Charlemagne governed it through local counts or marquises, who continued to rule, under the Carlovingians or the German emperors, and occasionally almost independently, till the latter part of the 12th century. The most celebrated of these Tuscan rulers was the countess Matilda (died 1115), who figured so conspicuously on the papal side in the struggle of Gregory VII. and his successors against the emperor Henry IV., and whose sway extended beyond the limits of Tuscany. She bequeathed her dominions to the papal see, but this bequest was disregarded by the emperors, of whom Frederick I. finally acquired Tuscany by purchase from the last marquis. Pope Innocent III. subsequently renewed the claims of Rome to the heritage of Matilda, and Tuscany, distracted by Guelph and Ghibelline feuds, was split up into numerous states, among which the republics of Florence, Pisa, Siena, and Lucca, which had long been rising into power, became the most important. After a bitter contest with Pisa and other cities, the republic of Florence became the ruling power. (See FLORENCE, and MEDICI.) Despite civil and foreign wars, the republic flourished and became celebrated in letters and art, especially under Cosmo and Lorenzo de' Medici. In 1532 Alessandro de' Medici was made duke by Pope Clement VII., with the assistance of the emperor of Germany and the king of France. After his assassination in 1537, Cosmo the Great was first appointed chief of the republic, and then assumed the title of grand duke of Tuscany (1569). His line becoming extinct in 1737, Francis, duke of Lorraine, consort of Maria Theresa of Austria, became by treaty grand duke of Tuscany as Francis II., and was subsequently elected emperor of Germany as Francis I. After his death the grand duchy was ruled by Leopold I. (afterward the emperor Leopold II.) and his son Ferdinand III. In 1799 it was invaded by the French. Napoleon created in 1801 the kingdom of Etruria, which he gave to Louis, crown prince of Parma, whose wife, Maria Louisa of Spain, succeeded him as regent. In 1808 Napoleon made his sister Elisa Bacciochi grand duchess of Tuscany. In 1814 it was occupied by the allies on behalf of Ferdinand III., who was restored in 1815, Elba and other territories being added to his dominions; and Lucca, comprised in the possessions of Napoleon's widow Maria Louisa, grand duchess of Parma, reverted to Tuscany in 1847. The grand duke Leopold II., son of Ferdinand III., was compelled to abdicate in 1859; his son and nominal successor, Ferdinand IV., was dispossessed in 1860 by Victor Emanuel, and Tuscany became part of the kingdom of Italy. (See ITALY.)—See *Storia civile della Toscana dal* 1738 *al* 1848, by Zobi (5 vols., Florence, 1853); "Tuscany in 1849 and 1859," by Mrs. Trollope (London, 1859); and *La Toscane au moyen âge*, by G. R. de Fleury (Paris, 1870).

TUSCARAWAS, an E. county of Ohio, intersected by the Tuscarawas river, one of the head streams of the Muskingum; area, 520 sq. m.; pop. in 1870, 33,840. The surface is undulating and the soil fertile. Iron ore and bituminous coal abound. It is traversed by the Ohio canal, the Tuscarawas branch of the Cleveland and Pittsburgh railroad, and the Lake Shore and Tuscarawas Valley and the Pittsburgh, Cincinnati, and St. Louis railroads. The chief productions in 1870 were 509,295 bushels of wheat, 20,520 of rye, 723,659 of Indian corn, 683,594 of oats, 18,192 of barley, 133,705 of potatoes, 496,414 lbs. of wool, 917,708 of butter, 97,112 of cheese, and 41,459 tons of hay. There were 9,188 horses, 10,077 milch cows, 11,369 other cattle, 128,301 sheep, and 20,361 swine; 3 manufactories of agricultural implements, 3 of brick, 24 of carriages and wagons, 13 of clothing, 1 of pig iron, 4 of iron castings, 13 of saddlery and harness, 3 of salt, 5 of woollen goods, 16 flour mills, 16 tanneries, 13 currying establishments, 3 breweries, 3 planing mills, and 8 saw mills. Capital, New Philadelphia.

TUSCARORAS, one of the Six Nations of Iroquois, which separated from the others at an early period, and according to tradition went southwest and then southeast to North Carolina. They were divided into seven clans, and about the year 1700 occupied 15 villages and had 1,200 warriors. In 1711 they attempted to massacre the whites, but troops were called from South Carolina, and Barnwell routed them in the battle of the Neuse, Jan. 28, 1712, killing and wounding 400. They made peace, but hostilities were soon resumed. Col. Moore marched against Nahucke, a Tuscarora fort near Snowhill, and took it March 20, 1713, capturing 800 prisoners, who were given to his Indian allies. The remaining Tuscaroras fled, most of them making their way to New York. The Tuscaroras under Tom Blunt had taken no part in the hostilities. A treaty had been made with them, Nov. 25, 1712, and Blunt was made king of all the tribe in Carolina. They were placed first on Pamlico river, and were afterward removed to the Roanoke in the present Bertie co. Those who removed to New York were well received by the Five Nations and allowed to settle at the S. E. end of Oneida lake, and were formally admitted as a sixth nation in the league. During the wars with the French the Tuscaroras served under the English. In 1766 the Carolina band leased part of their lands for 150 years, and 160 removed to New York. During the revolution they sided with congress, and some of their chiefs were commissioned as captains and lieutenants; and in 1794 the United States indemnified the tribe for losses during the war. The whole tribe in time removed from North Carolina, continuing to receive rents for their lands; but as this caused difficulties, an arrangement was made by which North Carolina in 1829 sold the reversion and paid the money to the tribe. The tribe in New York occupied a reservation on Niagara ridge given them by the Senecas and confirmed by the state of New York, and an adjoining tract purchased by them from the Holland land company. A Baptist mission and school were established among them about 1800, and they have since advanced in agriculture and the arts of civilized life. In 1874 there were 388 Tuscaroras on the reservation, and there are a number in Canada with the bands of the Six Nations who emigrated thither. The name Tuscarora means shirt wearer, and must be of comparatively recent adoption.

TUSCOLA, an E. county of the S. peninsula of Michigan, bounded N. W. by Saginaw bay and intersected by the Cass river; area, about 850 sq. m.; pop. in 1870, 13,714; in 1874, 16,998. The surface is level, the soil productive, and timber is abundant. The Detroit and Bay City railroad traverses it. The chief productions in 1870 were 116,480 bushels of wheat, 82,880 of Indian corn, 84,475 of oats, 12,610 of peas and beans, 122,102 of potatoes, 40,635 lbs. of wool, 359,136 of butter, and 14,996 tons of hay. There were 2,163 horses, 3,333 milch cows, 4,861 other cattle, 9,428 sheep, and 3,713 swine; 2 flour mills, 1 tannery, 25 saw mills, and 1 woollen factory. Capital, Vassar.

TUSCULUM. See Frascati.

TUSCUMBIA, a city and the capital of Colbert co., Alabama, on the Memphis and Charleston railroad, 2 m. S. of the Tennessee river, and about 180 m. N. N. W. of Montgomery; pop. in 1870, 1,214, of whom 450 were colored; in 1875, about 1,500. Steam navigation is interrupted at this point by Muscle shoals, around which a canal is in process of construction. Tuscumbia has a healthful and agreeable climate, and is situated in a very fertile region, with coal and iron near at hand. About the centre of the city is a large spring of pure water, giving rise to Spring creek, which flows into the Tennessee. There are two large flouring mills, to one of which a cotton gin is attached, a female seminary, a small academy, a weekly newspaper, and eight churches (five for white and three for colored people). Tuscumbia was first settled in 1816, and was incorporated under its present name in 1822. It suffered much during the civil war, but is beginning to recover.

TUSSER, Thomas, an English poet, born at Rivenhall, near Witham, Essex, about 1515, died in London about 1580. He became a chorister, and finally served as a retainer in the family of William Lord Paget. Afterward he became a farmer at Katwade (now Cattiwade) in Suffolk, where he wrote "A Hundreth Good Pointes of Husbandrie" (1557). This was the first didactic poem in the language, and in 1573 appeared as "Fiue Hundreth Points of Good Husbandry vnited to as many of Good Huswiferie" (reprinted by Dr. Mavor in 1812). Fuller says Tusser was "successively a musician, schoolmaster, serving man, husbandman, grazier, poet, more skilful in all than thriving in any vocation."

TUTUILA. See Samoan Islands.

TUXPAN, a town of Mexico, in the state and 145 m. N. W. of the city of Vera Cruz, on the river Tuxpan, 5 m. from the gulf of Mexico; pop. about 5,000. It is situated at the foot of several verdure-covered hills, with groves of mangoes, oranges, and palms in the vicinity. A surrounding tract of 400,000 acres, suitable for sugar, tobacco, and fruit plantations, belongs to a stock company. The commerce of Tuxpan is annually increasing; its most important trade is in cedar logs. In the year ending Sept. 30, 1874, 105 vessels arrived, and 109 cleared. The total imports were $71,876; exports, $175,329. A bar at the mouth of the river cannot be crossed by large vessels, but the river is navigable for small craft 60 m.

TVER. I. A central government of Russia, bordering on Novgorod, Yaroslav, Vladimir, Moscow, Smolensk, and Pskov; area, 25,223 sq. m.; pop. in 1870, 1,528,881. The surface is elevated in the south, and slopes toward the north, where it terminates in an extensive plain. The Volga rises in this goverment, and is connected with the Neva by canal. Among the numerous other rivers is the Düna. There are several lakes, the largest of which, Lake Seliger, covers 76 sq. m. The soil is inferior, and the quantity of grain raised is scarcely sufficient for home consumption. A large portion of the surface is covered with forests, principally birch, beech, and pine. The railway connecting Moscow with St. Petersburg passes through the government, and, together with its water communication with the Baltic, Black, and Caspian seas, gives it an important transit trade. **II.** A city, capital of the government, at the junction of the Tvertza with the Volga, 98 m. N. W. of Moscow; pop. about 30,000. It has a fortress, a suburb on the opposite bank of the Volga, streets and squares beautifully rebuilt after the fire of 1763, fine promenades, a female gymnasium and one for boys, a large Gothic cathedral and 30 other churches, and many private and public palaces. Tver is the chief emporium of the upper Volga, with an extensive trade. In former times it was the capital of the grand duchy of Tver, and now it is the seat of an archbishop and a governor general.

TWEED, a river of Scotland and England, which rises at Tweedshaws, at the S. extremity of Peeblesshire, 1,500 ft. above sea level, among the Lowther hills, whence it runs about 20 m. N. E., and then turning E. crosses the counties of Selkirk and Roxburgh, separates Berwickshire from the English county of Northumberland, and for the last 4½ m. of its course lies wholly within English territory. It enters the North sea at the town of Berwick. Its length is 95 m., and it drains an area of 1,870 m., more than any other Scottish river except the Tay. Its principal affluents from the north are the Biggar, Gala, Leader, and Adder, and from the south the Yarrow, Ettrick, Teviot, and Till. It is navigable only a few miles from its mouth, but is remarkable for its salmon fisheries (once worth £15,000 a year, but now much reduced) and its scenery.

TWEED, William Marcy, an American politician, born in New York, April 3, 1823, died April 12, 1878. He was a chair maker, and later in life was admitted to the bar. In 1852–'3 he was an alderman, in 1853–'5 a member of congress, in 1856 a supervisor of the city and chairman of the board, in 1856–'7 a school commissioner, from 1861 to 1870 deputy street commissioner, and from 1867 to 1871 a state senator. In April, 1870, he was appointed commissioner of the department of public works, and while he held this office he and his "ring," especially in connection with the building and furnishing of the new city court house, appropriated vast sums of public money to private use. On Oct. 28, 1871, he was arrested in a civil suit on charges of malfeasance, brought by Charles O'Conor on behalf of the people, and gave bail in $1,000,000. In November of the same year he was reëlected to the state senate, but did not take his seat. On Dec. 16 he was arrested on a criminal charge of fraud, but was released on $5,000 bail. On Jan. 30, 1873, the first of the suits was tried, and the jury disagreed. On Nov. 19 he was found guilty of fraud, and was sentenced to 12 years' imprisonment on as many different counts, and to pay a fine of $12,550. He was sent to the penitentiary on Blackwell's island, and subsequently was disbarred. On April 7, 1875, a suit was begun in the supreme court of New York on behalf of the people to recover $6,000,000 from him. These were the principal of several suits both civil and criminal brought against him. On June 15 the court of appeals decided that his further imprisonment was illegal, on the ground that the court below had exceeded its powers in its cumulative sentence, and ordered his discharge. He was then ordered to find bail to the amount of $3,000,000 in the pending civil suits, and in default of the same was sent to Ludlow street jail. He escaped on Dec. 4, 1875, but was recaptured in Spain, and remained in the Ludlow street jail till his death.

TWEEDDALE. See Peeblesshire.

TWESTEN. I. August Detlev Christian, a German theologian, born in Glückstadt, April 11, 1789, died in Berlin, Jan. 8, 1876. He studied at Kiel, and taught at Berlin, where he adopted the views of Schleiermacher. In 1814 he became professor of theology at Kiel, and soon ranked next to Claus Harms in the Lutheran church of Holstein. In 1835 he succeeded Schleiermacher at Berlin, and in 1850 became a member of the new supreme ecclesiastical council of the United Evangelical church. He was one of the chief representatives of those who strive to reconcile the views of Schleiermacher with orthodox Lutheranism. His works include *Vorlesungen über die Dogmatik der evangelisch-lutherischen Kirche* (2 vols., Hamburg, 1826-'37), and *Grundriss der analytischen Logik* (Kiel, 1834). **II. Karl**, a German author, son of the preceding, born in Kiel, April 22, 1820, died in Berlin, Oct. 14, 1870. He became connected with the judicial service, and was one of the founders of the progressive party, which in 1861 involved him in a duel with Gen. Manteuffel, in which he lost his right arm. In the same year he was elected to the Prussian chamber of deputies, and he was one of the founders of the national-liberty party and an early member of the North German Reichstag. Persecuted for advocating the fullest parliamentary freedom, he retired in 1868 after being fined. His works include *Schiller in seinem Verhältniss zur Wissenschaft* (Berlin, 1863), *Machiavelli* (1868), and the posthumous *Die religiösen, politischen und socialen Ideen der asiatischen Culturvölker und der Aegypter in ihrer historischen Entwickelung* (edited by M. Lazarus, 1873).

TWICKENHAM, a village and parish of Middlesex, England, on the left bank of the Thames, opposite Richmond, with which it is connected by a handsome bridge, about 10 m. W. S. W. of St. Paul's, London; pop. in 1871, 10,533. It is celebrated as the residence of Pope, whose villa has been destroyed; but his grotto is still standing, and his monument is in the parish church, where he was buried. Walpole's seat, called Strawberry Hill, is about 1 m. distant. At Twickenham is also Orleans house, occupied by Louis Philippe while a refugee in England before his accession to the throne, and still belonging to his family. In 1874 the large church of St. Stephen was completed, and a new quarter between the old village and Richmond bridge was added to the parish.

TWIGGS, a central county of Georgia, bounded W. by the Ocmulgee river; area, 400 sq. m.; pop. in 1870, 8,545, of whom 5,632 were colored. The surface is moderately hilly and the soil fertile. The Georgia Central railroad crosses the N. border, and the Macon and Brunswick railroad intersects the W. part. The chief productions in 1870 were 164,145 bushels of Indian corn, 18,163 of sweet potatoes, and 6,189 bales of cotton. There were 473 horses, 1,046 mules and asses, 1,172 milch cows, 2,583 other cattle, 794 sheep, and 6,991 swine; 5 flour mills, and 1 saw mill. Capital, Marion.

TWILIGHT, the faint light which appears in the sky a little before sunrise, and again for some time after sunset, the amount and duration of the light varying materially in different latitudes and at different seasons. The light is caused by the reflection of the sun's rays, when below the horizon, from the vapors and minute solid particles floating in it, and perhaps from the material atoms of the air itself. To this property of reflection possessed by the atmosphere its illumination is due beyond the direct reach of the rays proceeding from the sun, as under the shadow of clouds and behind opaque objects upon the surface, where, unless the light were directed upon some principle of general diffusion, intense darkness would prevail. So also a sudden illumination would attend the rising of the sun and instantaneous darkness accompany his setting. As the sun sets to any point upon the surface of the earth, the atmosphere above this point all around the horizon is illuminated by direct rays, and the reflection from so broad an illuminated surface brings to the earth a large amount of light; but as the dark shadow of the earth, in consequence of the continued sinking of the sun, rises higher and higher into the atmosphere at this locality, the reflected light steadily diminishes, and finally disappears when no direct rays from the sun reach the higher regions of the atmosphere above the horizontal line extended toward the sunset. By observing the time after the setting of the sun to the disappearance of the reflected rays, data are afforded upon which an approximate estimate may be made of the height of the atmosphere, or at least of that portion of the atmosphere which is capable of being illuminated in the manner above described; and it is on this method chiefly that this calculation is based. On the equator, when the sun is in the equinoctial, and apparently descending vertically, and occupying as much time below as above the horizon, the duration of the twilight is an hour and 12 minutes, or one tenth of the semicircumference, equal to 18°; whence it is concluded that such must be its depression below the horizon at any place before the twilight can end; and it is reckoned from this that the height of the atmosphere is a little over 52 m. But this cannot be otherwise than a rude approximation, the calculation proceeding on the supposition of there being but one direct reflection, whereas the rays may be reflected again and again, and no account being made of the refraction the rays must experience in their direct passage through the dense stratum of air near the surface, and entering it again when turned back from the upper strata. By a different calculation, founded on observations of the progress of the edge of the dark shadow (known till it reaches the zenith as the anticrepuscular, and afterward as the crepuscular curve), made in the pure and transparent air at the summit of high mountains, the height of the atmosphere has been found by French astronomers (whose observations are recorded in the *Annuaire météorologique de France*, 1850) to be 71·46 m. This curve they found set when the sun was 17° below the horizon. The variable length of the twilight at the same place in different seasons results from the varying declination of the sun and the consequent difference of time required to sink 17° or 18° below the horizon, as his course is vertical or more or less approaching it. Near the poles, where the sun attains at noon no great height above the horizon, it also keeps near it after disappearing each night; and if its depression does not exceed 18°, the twilight is continuous into the dawn. This is the case in some portion of the summer in all places for which the least polar distance of the sun is only 18° greater than the latitude, that is, all places in higher N. or S. latitude than 48½° (the complement of 18° + 23½°, or 41½°). At a place in 48½° N. or S. latitude, the midnight depression of the sun at midsummer amounts to 41½°, the complement of the latitude, diminished by 23½°, the obliquity of the ecliptic, that is, to 18°; and there is therefore no twilight at midnight at this the most favorable season of the year. At lower latitudes there is of course no twilight at midnight. In higher and higher latitudes, as the sun is less and less depressed below the horizon at midnight in summer, the twilight increases in brilliancy, and is finally lost during the period that the circuit of the sun is above the horizon.—A beautiful feature attending the twilight is the rich coloring of the clouds upon which the direct rays of the sun strike, and from which they are reflected in gorgeous tints, which slowly change their hues as the angle of reflection varies. This phenomenon is seen in greatest perfection in mountainous regions and over wide districts, where the air remains in a uniform condition unaffected by local causes. The presence of much moisture is also favorable for the display of the finest colors. Thus at sea, especially in the warm atmosphere of the Gulf stream, these exhibitions are of the finest character, as also over the waters of inland seas. Even when no clouds are formed, brilliantly colored bands are produced along the horizon, which change in a somewhat regular order with the continued rising or declining of the sun. These tints are due to the different powers of penetration possessed by the different rays of which white light is composed. In the same manner as the solar rays are decomposed and present different colors in passing through a piece of glass covered with smoke in layers of different thickness, these rays are also decomposed in penetrating the dense and humid lower strata of the atmosphere. A slight obstruction of this kind extinguishes the blue rays, and causes those which pass through to appear yellowish red; next to this the yellow is arrested, and the light is orange; till with further obstruction the yellow entirely disappears, and the red rays alone reach the surface.

TWISS, Sir Travers, an English jurist, born in London in 1810. He graduated at Oxford in 1840, and was professor of political economy there from 1842 to 1852, afterward of international law at King's college, London, and from 1855 to 1870 regius professor of civil law at Oxford. During the same time, after his admission to the bar, he held various offices, and in 1867 was knighted on becoming queen's advocate general, from which office he retired in 1872. His works include "Epitome of Niebuhr's History of Rome" (1837); "The Law of Nations, considered as independent Political Communities" (1861), in a revised and enlarged edition of which (1876) he maintains that the three points of the Geneva court of arbitration served only to settle a passing dispute, and are now a dead letter; "The Black Book of the Admiralty," relating to ancient maritime customs and laws (1874 *et seq.*); and *Monumenta Juridica* (3 vols., 1875 *et seq.*). The last two were published under the auspices of the master of the rolls. He has also published an annotated edition of Livy (4 vols., 1840–'41).

TWITE. See LINNET.

TWO MOUNTAINS (Fr. *Deux Montagnes*), a S. W. county of Quebec, Canada, on the N. bank of the Ottawa river, at its entrance into the St. Lawrence; area, 258 sq. m.; pop. in 1871, 15,615, of whom 13,972 were of French, 770 of Irish, 348 of Scotch origin or descent, and 416 Indians. It is watered by the rivière du Nord and rivière du Chêne, affluents of the Ottawa. Capital, Ste. Scholastique.

TYBEE, an island and sound at the mouth of the Savannah river, Georgia. The sound is more properly a bay of the Atlantic; it extends from Tybee island on the south to Hilton Head island on the north. The island is about 6 m. long and 3 m. broad. In the civil war it was occupied by the federal forces, under Brig. Gen. T. W. Sherman, Nov. 28, 1861, and Fort Pulaski was reduced by their batteries on April 10–11, 1862.

TYCHE. See FORTUNA.

TYCHO BRAHE. See BRAHE.

TYCHSEN, Olaus Gerhard, a German orientalist, born in Tondern, Schleswig, Dec. 14, 1734, died in Rostock, Dec. 30, 1815. He was educated at Göttingen, and in 1760 became professor of oriental literature at Bützow. When the university was removed to Rostock in 1789 he was appointed chief librarian and keeper of the museum. His most important work is a journal called *Bützow'sche Nebenstunden* ("Leisure Hours at Bützow," 6 vols., 1766–'9). He is noted for his dissertations upon the rabbinical language, oriental numismatics, and epigraphy. His life has been written by Hartmann (4 vols., Bremen, 1818–'20).

TYCOON, or Shogun. See JAPAN, vol. ix., pp. 542, 543.

TYLER. I. A N. W. county of West Virginia, bordering on the Ohio river, and intersected by Middle Island creek; area, 390 sq. m.; pop. in 1870, 7,832, of whom 10 were colored. The surface is undulating or rolling, and the soil in the valleys productive. Iron ore, bituminous coal, and excellent building stone and limestone are found in great abundance. The chief productions in 1870 were 157,302 bushels of Indian corn, 41,262 of wheat, 42,480 of oats, 21,386 of potatoes, 47,969 lbs. of tobacco, 26,704 of wool, 108,080 of butter, and 4,365 tons of hay. There were 1,897 horses, 1,566 milch cows, 3,615 other cattle, 12,115 sheep, and 5,402 swine; 2 saw mills, and 2 woollen factories. Capital, Middlebourne. **II.** An E. county of Texas, bounded N. and E. by the Neches river; area, 1,130 sq. m.; pop. in 1870, 5,010, of whom 1,472 were colored.

The surface is level and the soil fertile, and timber is abundant. The chief productions in 1870 were 121,723 bushels of Indian corn, 41,580 of sweet potatoes, 13,666 lbs. of rice, and 2,236 bales of cotton. There were 1,303 horses, 10,350 cattle, 3,175 sheep, and 16,781 swine. Capital, Woodville.

TYLER, Bennet, an American clergyman, born in Middlebury, Conn., July 10, 1783, died in South Windsor, May 14, 1858. He graduated at Yale college in 1804, was pastor of the Congregational church in South Britain, Conn., from 1808 to 1822, president of Dartmouth college from 1822 to 1828, and pastor of the second Congregational church in Portland, Me., from 1828 to 1833. The controversy on the "new divinity" awakened by the writings of Dr. Taylor (see TAYLOR, NATHANIEL WILLIAM), of which he was the principal opponent, resulted in the formation of a pastoral union in September, 1833, by the Connecticut clergymen who held to Dr. Tyler's opinions, and the resolution to found a theological seminary at East Windsor, of which he was president and professor of Christian theology till his death. His principal works are: "History of the New Haven Theology, in Letters to a Clergyman" (1837); "A Review of Day on the Will" (1837); "Memoir of Rev. Asahel Nettleton, D. D." (Hartford, 1844); "Nettleton's Remains" (1845); "A Treatise on the Sufferings of Christ" (New York, 1845); "A Treatise on New England Revivals" (1846); and two series of "Letters to Dr. Horace Bushnell on Christian Nurture" (1847–'8). After his death appeared his "Lectures on Theology," with a memoir by his son-in-law, the Rev. Nahum Gale, D. D. (1859).

TYLER, John, tenth president of the United States, born in Charles City co., Va., March 29, 1790, died in Richmond, Jan. 17, 1862. He was the second son of John Tyler, who was a prominent revolutionary patriot, governor of the state from 1808 to 1811, afterward judge of the federal court of admiralty, and died in 1813. He graduated at William and Mary college in 1807, and in 1809 was admitted to the bar. Two years later he was elected a member of the legislature, and he was reëlected for five successive years. In 1816 he was elected to congress to fill a vacancy, and was twice reëlected. He voted for the resolutions of censure on Gen. Jackson's conduct during the Seminole war, and opposed internal improvements by the general government, the United States bank, the protective policy, and all restrictions on slavery. Ill health compelled him to resign before the expiration of his term. In 1823 and the two following years he was a leading member of the state legislature. In December, 1825, he was chosen governor by the legislature, and at the next session was reëlected by a unanimous vote. He succeeded John Randolph as United States senator in March, 1827, and was reëlected in 1833. In the presidential election of 1824 he had supported Mr. Crawford, who received the vote of Virginia. He however approved the choice of Mr. Adams in preference to Gen. Jackson by the house of representatives; but seeing in Adams's first message "an almost total disregard of the federative principle," he sided in the senate with the opposition to him, consisting of the combined followers of Jackson, Crawford, and Calhoun. He voted against the tariff bill of 1828, and against all projects of internal improvement. During the debate on Mr. Clay's tariff resolutions in 1831–'2, he made a three days' speech against a tariff for direct protection, but advocating one for revenue with incidental protection to home industry. In 1832 he avowed his sympathy with the nullification movement in South Carolina, and made a speech against the force bill, which passed the senate with no vote but his in the negative, Mr. Calhoun and the other opponents of the bill having retired from the chamber; but he voted for Mr. Clay's compromise bill. In the session of 1833–'4 he supported Mr. Clay's resolutions of censure upon President Jackson for the removal of the deposits, which he regarded as an unwarrantable assumption of power, although he considered the bank unconstitutional. The legislature of Virginia having in February, 1836, adopted resolutions instructing the senators from that state to vote for expunging those resolutions from the journal of the senate, Mr. Tyler resigned and returned to his home, which about this time he had removed to Williamsburg. In 1836, as a whig candidate for vice president, he obtained the votes of Maryland, Georgia, South Carolina, and Tennessee. In 1838 he was elected to the legislature by the whigs of James City co., and during the subsequent session of that body he acted entirely with the whig party. He was a delegate from Virginia to the whig national presidential convention which met at Harrisburg, Dec. 4, 1839, and was nominated for vice president with Gen. Harrison as president, and elected in November, 1840. President Harrison died just one month after his inauguration, and the administration devolved on the vice president. Mr. Tyler requested the members of the cabinet to remain in the places they held under President Harrison. Three days later he published an inaugural address, which in its indications of political principle was satisfactory to the whigs, and he at once began to remove from office the democrats appointed by previous administrations, and to fill their places with whigs. In his message to the congress which convened in extra session, May 31, 1841, he discussed at considerable length the question of a national bank, at that period a leading feature of whig policy; and he intimated to several members his desire that congress should request a plan for a bank from the secretary of the treasury. Resolutions for this purpose were adopted by both houses, and Mr. Ewing sent in a bill for the incorporation of the

"Fiscal Bank of the United States," the essential features of which were framed in accordance with the president's suggestions and in deference to his peculiar views of the institution. The bill was finally passed by congress on Aug. 6, with a clause concerning branch banks differing from Mr. Ewing's, and sent to the president, who returned it with a veto message, in which he declared the act unconstitutional in several particulars. This veto created great excitement and anger among the whigs throughout the country. The whig leaders in congress, however, made yet another effort to conciliate the president and secure his assent to their favorite measure. A bill was prepared embracing certain features supposed to be acceptable to the president, and was privately submitted to and approved by him and his cabinet, and finally without any alteration passed by the house, Aug. 23, and by the senate two weeks later; but the president, who by some communications was made to believe that the bill was framed with the object of entrapping him into an act of inconsistency, vetoed it. Very soon after the promulgation of the veto, the cabinet, with the exception of Mr. Webster, the secretary of state, sent in their resignations, and published statements of their reasons for this step, reflecting severely on the conduct of President Tyler. The president filled their places by appointing Walter Forward of Pennsylvania secretary of the treasury; John C. Spencer of New York, secretary of war; Abel P. Upshur of Virginia, secretary of the navy; Charles A. Wickliffe of Kentucky, postmaster general; and Hugh S. Legaré of South Carolina, attorney general—all of them whigs, or at least opponents of the democratic party. Before the adjournment of congress, Sept. 13, the whig members published a manifesto proclaiming that all political relations between them and the president were at an end. The course taken by Mr. Webster, though condemned by some of the whigs, was justified by the greater portion of the people on the ground of the critical condition of our relations with Great Britain on the subject of the northeastern boundary, in regard to which he was at the time engaged in negotiations with the British ministry. After a satisfactory treaty was arranged and ratified (August, 1842), Mr. Webster resigned, and was succeeded by Mr. Legaré, who died soon after. In July, 1843, President Tyler reorganized his cabinet as follows: Mr. Upshur, secretary of state; Mr. Spencer, secretary of the treasury; Mr. Wickliffe, postmaster general; James M. Porter of Pennsylvania, secretary of war; David Henshaw of Massachusetts, secretary of the navy; John Nelson of Maryland, attorney general. Messrs. Porter, Henshaw, and Nelson were democrats, and the first two were rejected by the senate when their nominations came before it. In their places the president appointed William Wilkins of Pennsylvania, secretary of war, and Thomas W. Gilmer of Virginia, of the navy, who were confirmed, Feb. 15, 1844. On Feb. 28 Mr. Gilmer and Mr. Upshur, while inspecting the steamer Princeton, were killed by the bursting of a gun, and Mr. Calhoun of South Carolina was appointed secretary of state, and John Y. Mason of Virginia secretary of the navy. Under the management of Mr. Calhoun a treaty of annexation was concluded between the United States and Texas, April 12, 1844, which was rejected by the senate. But the scheme of annexation was vigorously prosecuted by the president, and at the very close of his administration brought to a successful issue by the passage of joint resolutions by congress, approved March 1, 1845. The other most important measures of his administration were the act establishing a uniform system of proceedings in bankruptcy, passed in August, 1841, and the protective tariff law of 1842. Toward the close of Mr. Tyler's term it became evident that he had lost the confidence of the whigs without having secured that of the democrats. In May, 1844, a convention composed chiefly of officeholders assembled at Baltimore and tendered him a nomination for the presidency, which he accepted; but in August, perceiving that he had really no popular support, he withdrew from the canvass. In 1861 he was a member of the peace convention, composed of delegates from the "border states," which met at Washington to endeavor to arrange terms of compromise between the seceded states of the south and the federal government. Of this convention he was elected president, but nothing resulted from its deliberations. He subsequently renounced his allegiance to the United States, and gave his support to the confederate cause. At the time of his death he was a member of the confederate congress.

TYLER, Royall, an American author, born in Boston, July 18, 1757, died in Brattleboro, Vt., Aug. 16, 1826. He graduated at Harvard college in 1776, and studied law under John Adams. He was for a short time aide to Gen. Lincoln. In 1790 he commenced the practice of law in Guilford, Vt. From 1800 to 1806 he was chief justice of the state supreme court, and he published "Reports of Cases in the Supreme Court of Vermont" (2 vols., 1809). He was also known as a dramatist, his play "The Contrast," produced in New York in 1786, being the first American play acted by a regular company, and the first also in which an attempt was made to portray the conventional Yankee character. It was followed by "May Day, or New York in an Uproar" (1787), and "The Georgia Spec, or Land in the Moon" (1797). He also published "The Algerine Captive," a novel (2 vols., 1799).

TYLER, Samuel, an American author, born in Prince George's co., Md., Oct. 22, 1809. He was admitted to the Maryland bar in 1831, and settled in Frederick City, where he has since resided. In 1836 he contributed to the

"Princeton Review" an article on "Balfour's Inquiry," which was followed by several philosophical articles, and a volume entitled "A Discourse of the Baconian Philosophy" (1844). He has also published "Burns as a Poet and as a Man" (New York, 1848); "The Progress of Philosophy in the Past and in the Future" (1859; 2d ed., 1868); and a biography of Chief Justice Taney (1872).

TYLER, William Seymour, an American linguist, born at Harford, Pa., Sept. 2, 1810. He graduated at Amherst college in 1830, and in 1831 became a classical teacher in Amherst academy. He afterward studied at Andover theological seminary, and was licensed to preach by the third presbytery of New York city in 1836; but, being elected professor of the Latin and Greek languages and literature in Amherst college about the same time, he was not ordained till 22 years later. In 1847 the professorship of ancient languages was divided, Prof. Tyler retaining that of Greek. In 1855 he visited Europe and the East, and in 1869 Greece and Egypt. He has published "The Germania and Agricola of Tacitus" (New York, 1847); "The Histories of Tacitus" (1848); "Prize Essay on Prayer for Colleges" (1854); "Plato's Apology and Crito" (1859); a "Life of Dr. Henry Lobdell, Missionary at Mosul" (Boston, 1859); "Theology of the Greek Poets" (1867); "History of Amherst College" (Springfield, Mass., 1873); "Demosthenes De Corona" (Boston, 1874); and "The Olynthiacs and Philippics of Demosthenes" (1875); besides papers in the "Transactions of the American Philological Association," and contributions to the "Biblical Repository," "Bibliotheca Sacra," "American Theological Review," &c.

TYLOR, Edward Burnett, an English author, born in London, Oct. 2, 1832. He was educated at the school of the society of Friends, Grove house, Tottenham, and in 1871 was elected a member of the royal society. He has published "Anahuac, or Mexico and the Mexicans, Ancient and Modern" (London, 1861); "Researches into the Early History of Mankind, and Development of Civilization" (1865); and "Primitive Culture: Researches into the Development of Mythology, Philosophy, Religion, Art, and Custom" (2 vols., 1871).

TYMPANUM. See EAR.

TYNDALE, William, an English reformer, born at North Nibley, Gloucestershire, about 1484, executed at Vilvoorden, in Brabant, Oct. 6, 1536. He was educated at Oxford and Cambridge, took orders, and was tutor and chaplain in the house of Sir John Welch near Bristol. He sympathized with the reformation, and while in this family he translated the *Enchiridion Militis*, or "Soldier's Manual," of Erasmus into English. His boldness of speech induced suspicion, and he went to London, where he began his translation of the New Testament. He was soon compelled to flee again, and with the promise of an annuity of £10 from Alderman Munmouth, on condition of praying for the souls of the alderman's parents, he went to Hamburg, where for a year he gave himself to his work; thence to Cologne, where the first ten sheets of his translation were put to press; and thence to Worms, where in 1525 two editions were published anonymously. They had speedy and wide circulation. The edict of the bishop of London, forbidding under heavy penalties their use or their possession, only increased the demand. Tyndale was lampooned by Sir Thomas More in seven books of elaborate abuse, and plots were laid to arrest him, which he foiled by removing in 1528 to Marburg, where he published his work on "The Obedience of a Christian Man." In 1529 a fifth edition of the New Testament was printed; and in 1530 appeared Tyndale's translation of the Pentateuch. A new edition of the New Testament, revised and corrected, was issued at Antwerp in 1534, in which Tyndale avowed his responsibility for the work. At the instance of the English government he was arrested at Antwerp, and after 18 months' imprisonment at Vilvoorden was strangled and then burned at the stake. The works of Tyndale and Frith his assistant, collected and published after the reformation was established, were issued in London in 3 vols. 8vo in 1831, and by the "Parker Society" in 1848-'50. The translation of the New Testament was the principal model and basis of the King James version, and its diction is but little more obsolete. An edition of it was published in London in 1836, edited by George Offor (reprinted, Andover, Mass., 1837). A memorial was erected to Tyndale at Nibley Knoll, Gloucestershire, in November, 1866.

TYNDALL, John, a British natural philosopher, born at Leighlin Bridge, county Carlow, Ireland, Aug. 21, 1820. Under the guidance of his father, he received a strict religious training, and early became thoroughly conversant with the Bible. Having mastered Euclid, conic sections, and plane trigonometry, he was employed in the Irish and English ordnance surveys from 1839 to 1844. During the three succeeding years he was a railway engineer, and in 1847 he accepted a post in Queenwood college, Hampshire, which he resigned in the following year to attend the lectures of Bunsen at the university of Marburg. Here, in conjunction with Prof. Knoblauch, he undertook a series of experiments in magnetism and diamagnetism, proving the existence of a relation between the molecular constitution of matter and magnetic force, and demonstrating that the direction of greatest magnetic energy will fall in the line of greatest molecular condensation. The results of their combined investigations were embodied in a paper "On the Magneto-optic Properties of Crystals, and the Relation of Magnetism and Diamagnetism to Molecular Arrangement," published in the "Philosophical Magazine" for 1850. On graduating in 1851, he prepared a mathematical dissertation on screw surfaces (*Die Schrauben-*

fläche mit geneigter Erzeugungslinie, und die Bedingungen des Gleichgewichts auf solchen Schrauben). In the same year he removed to Berlin, where for some time he was engaged in the laboratory of Prof. Magnus. Shortly after his return to England he was elected a fellow of the royal society, and in 1852 one of the secretaries of the physical section of the British association. In June, 1853, he was appointed professor of natural philosophy at the royal institution, which office he still retains (1876). Tyndall first visited Switzerland in 1849, and in company with Prof. Huxley made a second journey in 1856, since which time he has visited the Alps every year. In the winter of 1859 he succeeded in establishing himself on the Montanvert, and determined the rate of winter motion of the Mer de Glace. With the coöperation of Dr. Frankland, he planted several thermometric stations on the slopes and summit of Mont Blanc, and made numerous observations relating to combustion at great altitudes. In 1861 he scaled the hitherto inaccessible peak of the Weisshorn, and in 1868 reached the summit of the Matterhorn, crossing it from Breuil to Zermatt. The results of his glacial investigations were published in the "Philosophical Transactions" (jointly with Prof. Huxley's) for 1858, and subsequently in "Glaciers of the Alps" (London, 1860), and "Hours of Exercise in the Alps" (1871). He opposed the views of Agassiz respecting the occurrence of laminæ in glaciers, definitely ascribing the true cause of their formation to mechanical pressure. Through the direct application of the doctrine of regelation, he arrived at a satisfactory understanding of the nature of glacial motion, proving, by carefully repeated observations on the structure and properties of ice, the inefficacy of the generally admitted plastic theory to account for that phenomenon. This discovery led to a protracted controversy with Professor (afterward Principal) Forbes of Edinburgh. (See Glacier, Ice, and Forbes, James David.) In 1863 he published "Heat considered as a Mode of Motion," which placed him in the front rank of scientific expounders. In 1866 he relieved Faraday in his duties at the Trinity house, and on the death of that philosopher in 1867 became superintendent of the royal institution. To observe the solar eclipse of December, 1870, he accompanied the British expedition to Algeria, and on his return voyage instituted a number of simple inquiries in relation to the color of the ocean. He demonstrated that the change of color frequently observed at different portions of the sea is due to the reflection of certain rays of light from the surfaces of innumerable particles of matter held in mechanical suspension at varying depths of the water's mass. Prof. Tyndall visited the United States in 1872, and delivered a course of lectures in some of the principal cities of the east, the proceeds of which, $13,000, were given to the establishment of a fund designed for promoting the study of the natural sciences in America. In the "Contemporary Review" for July, 1872, Prof. Tyndall published with commendation a letter addressed to himself, wherein the writer proposed that the efficacy of prayer should be tested by making one ward of a hospital the special object of the prayers of the faithful for a term of years, and then comparing its rate of mortality with that of other wards during the same time. This gave rise to a widespread controversy, and was popularly denominated "Tyndall's prayer test." In August, 1874, while presiding over the annual meeting of the British association, he delivered the famous inaugural known as the "Belfast Address," which was denounced as a declaration of materialism.—The labors of Prof. Tyndall, though more particularly directed toward the examination of the molecular constitution of matter, have not been confined to any special branch of physics. Between 1849 and 1856 he was mainly occupied with the prosecution of his experiments in magnetism and electricity, in the course of which he conclusively settled the question of diamagnetic or reversed polarity, the existence of which, originally asserted by Faraday, and reaffirmed by Weber in 1848, had been subsequently denied by the former. In 1859 he initiated a remarkable series of researches in radiant heat, which were extended over a period of more than ten years. The diathermancy of simple and compound gases, as well as of various vapors and liquids, was experimentally tested, and the degrees of their opacity to radiant heat determined with great precision. Dry atmospheric air, which had hitherto afforded but negative results to Melloni, was ascertained to have an absorptive power about equal to that of its main elementary components, and but a mere fraction of that of aqueous vapor; a discovery which, in its bearings on terrestrial and solar radiation, has exerted a marked influence on the progress of meteorology. The principle of the physical connection of the emission and absorption of undulations (first enunciated by Euler), which formed the basis of Angström's experiments on the radiation and absorption of incandescent solids, and which laid the foundation for the science of spectrum analysis, was applied by Tyndall to gases and vapors some time previous to the publication of Kirchhoff's more specialized generalizations respecting refrangibility. Tyndall's investigations on obscure and luminous radiations, and on the nature of calorescence, or the transmutation of heat rays, form some of the most noteworthy of his contributions to molecular physics. By means of a filter composed of a solution of iodine and the bisulphide of carbon, so constituted as to intercept all but the ultra-red rays of any luminous source of heat, he has ascertained that the visible thermal rays emanating from any particular body bear but a small ratio to the total number of thermal rays emitted by that body. He has also shown, by experiments made on his own eyes, that the calorific energy of a concentrated electric beam, capable of raising platinized platinum foil to vivid redness, and of instantaneously exploding gunpowder at an absolute dark focus, is incompetent to excite the sense of vision in the human retina. The subject of gaseous conductivity (which led to views antagonistic to those entertained by Magnus), the action of odors and colors on radiant heat, and the various laws governing acoustic and optical phenomena, have also engaged his attention. To him is due the beautiful interpretation of the azure color of the firmament, as well as of the changing tints accompanying the morning and evening twilight. (See Light.) Since 1873 his labors have been more generally related to those of the Trinity house, in connection with inquiries made into the causes which affect the acoustic transparency of the atmosphere. Prof. Tyndall is a strenuous advocate of the doctrine of evolution. His vigorous language and felicitous method of exposition have given him the highest position among scientific lecturers. Besides the works already mentioned, he has published "Mountaineering in 1861" (1862); "On Radiation" (1865); "Sound, a Course of eight Lectures" (1867; 3d ed., embracing his important observations on acoustic opacity, 1875); "Faraday as a Discoverer" (1868); "Natural Philosophy in Easy Lessons" (1869); "Notes of a Course of nine Lectures on Light" (1870); "Researches on Diamagnetism and Magne-crystallic Action" (1870); "Notes of a Course of seven Lectures on Electrical Phenomena and Theories" (1870); "Essays on the Use and Limit of the Imagination in Science" (1870); "Fragments of Science for Unscientific People" (1871); "The Forms of Water in Clouds and Rivers, Ice and Glaciers" (1872); and "Contributions to Molecular Physics in the Domain of Radiant Heat" (1872). Some of these have been translated into various European languages. His work on "Sound" has been published in Chinese at the expense of the Chinese government.

TYNE, a river of Northumberland, England, formed by the junction of the North and South Tyne, the former of which rises in the Cheviot hills, on the border between England and Scotland, and the latter in the E. part of Cumberland. These two streams unite near Hexham in the S. part of Northumberland, and the Tyne thence has a course of 35 m., generally E., to the North sea. It is navigable by vessels of 300 or 400 tons as far as Newcastle-upon-Tyne. Its principal affluent is the Derwent. The Tyne is the great outlet of the seaborne coal trade, and once possessed valuable salmon fisheries.

TYNEMOUTH, a town of Northumberland, England, on a promontory at the mouth of the Tyne, and adjoining North Shields, 8 m. N. E. of Newcastle; pop. in 1871, 38,941. It has a fine harbor in the form of a basin enclosed by rocky walls, and in the season is much resorted to for sea bathing. It has many handsome houses, and extensive rope manufactories, and holds four cattle fairs annually. There is a chalybeate spring; and in the vicinity are traces of a Roman fort, and the ruins of Tynemouth priory, founded in 625 and repeatedly rebuilt.

TYNG. I. Stephen Higginson, an American clergyman, born in Newburyport, Mass., March 1, 1800. He graduated at Harvard college in 1817, for two years was engaged in mercantile pursuits, then studied theology, and was ordained to the ministry of the Episcopal church, March 4, 1821. He preached for two years in Georgetown, D. C., and for six years in Queen Anne's parish, Prince George's co., Md. In 1829 he became rector of St. Paul's church, Philadelphia, in 1833 of the church of the Epiphany, and in 1845 of St. George's church, New York, which office he still occupies (1876). He has received the degree of D. D. from Jefferson and Harvard colleges. Dr. Tyng has published "Lectures on the Law and the Gospel" (1832); "Sermons preached in the Church of the Epiphany" (1839); "Recollections of England" (1847); "Christ is All" (1849; 4th ed., 1864); "The Captive Orphan: Esther, Queen of Persia" (1859); "Forty Years' Experience in Sunday Schools" (1860); "The Prayer Book Illustrated by Scripture" (3 series, 1863-'7); and "The Feast Enjoyed" (1868). For several years he edited the "Episcopal Recorder" and the "Protestant Churchman." **II. Stephen Higginson,** jr., an American clergyman, son of the preceding, born in Philadelphia, June 28, 1839. He graduated at Williams college in 1858, studied at the Virginia Episcopal theological seminary, was ordained on May 8, 1861, and was assistant to his father in St. George's church for two years. In 1863 he became rector of the church of the Mediator, New York, and two years later he organized a new parish in the same city, that of the Holy Trinity, which erected a new and enlarged church in 1873-'4, and of which he is still pastor (1876). He is editor of the "Working Church," a weekly journal. He received the degree of D. D. from Williams college in 1872.

TYPE (Gr. τύπτειν, to stamp), a piece of metal or wood having the form of a letter or other character in relief upon one end, used in printing. The various forms of type have been described in the article Printing, which also contains the history of their invention, the methods of their use, &c. The material of which book and newspaper types are made is an alloy known as type metal, composed of lead, antimony, tin, and sometimes copper and other metals. The metals of this alloy are combined in different proportions, to meet the different requirements of hardness, softness, tenacity, or cheapness. Lead is the chief constituent; antimony is added to compensate for the softness of the lead, tin to give toughness, and sometimes copper to give a still greater degree of tenacity. Copper is sparingly used; one per cent. of it gives to type metal a perceptible reddish tint. Type metal, although melting at a comparatively low heat, fills the mould with great solidity, and shrinks very slightly in cooling. It does not oxidize seriously when exposed to the action of air, water, ley, or ink. The durability of types has been greatly improved by the process of copper-facing, invented and patented in 1850 by Dr. L. V. Newton of New York. Through the agency of the electrotype battery (see GALVANISM, vol. vii., p. 601) a thin film of copper is deposited on the face of the type, making an efficient protection against abrasion and rapid wear.—The success of typography depends on the accuracy of the types. They must be made so that they can be combined and recombined and interchanged with the greatest facility. The page of a daily newspaper, which may contain 150,000 pieces of metal, must be truly square, as if made of one piece. The first step is the making of punches, which consists in cutting on the end of a short bar of soft steel a model for each character which will be used in the font or assortment of types. When the steel has been hardened, the punch is struck on the side of a thin bar of rolled copper, producing a reversed duplicate of the model type, which when truly squared and fitted to a mould constitutes the matrix. All the matrices of a font are made to fit one mould. The type mould consists of two firmly screwed combinations of several pieces of steel, making right and left halves, each of which is almost the counterpart of the other. These halves are immovable in the direction which determines the height or depth of the body, but are readily adjustable in the direction which determines the width of the letters, so that they can produce either l or W with no further delay than that caused by the change of matrix. At one end of the mould the matrix is fitted; at the other end is an opening through which the melted metal is injected. The founding of book and newspaper types is now done by a type-casting machine, which contains in the centre of the framework a pot of type metal kept fluid by a fire beneath. The mould is connected with the melted metal through a channel. In the pot is fitted a piston or plunger, which, receiving motion from a cam, forces the fluid metal through the channel into the mould and matrix. The metal injected, fused at low heat, and cooled by a blast of cold air, solidifies almost instantaneously. As soon as the mould receives the metal, it opens, the matrix springs backward, and a little hook throws out the type. The mould closes, the matrix falls into its seat, and the plunger injects a new supply of metal, which is again thrown out as a type. The speed of the machine is governed by the time required for cooling the metal in the mould, varying from 70 types of pica to 150 types of nonpareil in a minute. The type thrown out of the mould is usually perfect as to face, but imperfect as to body. A long piece of metal, called the jet, is attached to the foot, and must be broken off; the fracture made by this breaking must be grooved out; the corners of the body are sharp or wiry, and must be rubbed down on a grindstone. The types are then set up in rows and carefully examined, one by one, under a magnifying glass. The defective letters are thrown into the melting pot, and those approved are packed in paper, ready for the printer.—For the large displayed letters of posters, types are made of wood, usually maple or bay mahogany, and rarely of smaller size than one square inch. As these types are used only in single lines, and are kept in true line by straight strips of wood called reglet, they do not require the accuracy of body which is indispensable in metal types. Wood types are made by an ingenious application of the pantagraph, the invention of William Leavenworth of Allentown, N. J., who introduced it in 1834. A tracing point at one end of the pantagraph follows the outline of a large model letter; this tracing motion is accurately repeated at the opposite end by a rapidly revolving cutter or router, which cuts a letter of similar shape out of a block of wood. The routing tool does nearly all the work; only a few cuts of the graver are required to finish the type.—The types of all American type founderies are made to the standard height of $\frac{92}{100}$ of an inch. British types are usually of the same height, but those of founderies on the European continent are variable; some German types are nearly an inch, and Russian types are more than an inch in height. In all countries the graduations of sizes or of bodies of types has been very irregular. Pierre Simon Fournier of Paris, in 1764, proposed the first practicable system. He divided a selected body of type, then known as "Cicero," into 12 equal parts, and made one such part, which he called a typographic point, the unitary basis for determining the dimensions of every larger size. All sizes were to be even multiples of the typographic point. Fournier's system, which was adopted in France, had the serious defect of an undetermined size for the body Cicero. To remedy this defect, Didot fixed the body Cicero at $\frac{1}{72}$ part of the royal French foot, and gave all the bodies made therefrom standard numerical names, which defined the number of points belonging to each body. Didot's system is now used in nearly all type founderies on the continent, but it has the disadvantage of being based on a disused measure, the royal foot, and of being in entire disagreement with the French metrical system. It has not been adopted by any English or American type founder. In 1822 George Bruce of New York introduced in his own type foundery a new system, in which the dimensions of the bodies were determined by the rule of geometrical progression, doubling every seventh size in any part of the series of sizes, and making each size 12·2462 per cent.

smaller than the size following it. The distances between the sizes are irregular, but the dimensions of the bodies are in proper correlation. (See PRINTING, vol. xiii., p. 847.)—The matrices and moulds of the first printers were always made by goldsmiths and mechanicians, but the printers cast the types. As early as 1550 type founding was made a business entirely distinct from printing. Although types are now cast by machinery, and with improved appliances, the more important tools used in making them (the punch, matrix, and mould) are substantially the same as those used in the 15th century. Attempts have been made repeatedly to cast many types by one operation in multiple moulds, or to cut them like nails out of cold metal, but they have failed chiefly through the inability to secure accuracy of body. As the required accuracy can be produced only by casting types in an adjustable mould, it may be assumed that the inventor of the type mould was the inventor of typography. The literal translation of a tablet put up at Mentz in 1507 says that John Gutenberg was the first to make printing letters in brass. Engravings made by Amman at Frankfort in 1564, and by Moxon at London in 1683, prove that the old method of casting types by hand was that used by all type founders at the beginning of this century. The first important improvement in hand casting was made in 1811 by Archibald Binney of Philadelphia, who attached a spring lever to the matrix of the hand mould, giving it an automatic return movement which enabled the type caster to double his old performance. In 1834 David Bruce of New York attached a hand force pump to the mould, which was of great value in the casting of large types, and gave a new impetus to the making of ornamental letters. William M. Johnson of Hempstead, Long Island, invented in 1828 a type-casting machine, which was used for some years by Elihu White of New York; but it was finally abandoned on account of the porousness of the types made by it. In 1838 David Bruce, jr., patented the machine which is the basis of most of those now used in America and Europe. The making of matrices by the electrotype process instead of by punching (a process of some value in the reproduction of matrices from types, or engravings in wood or soft metal) is the only recent improvement which has been generally adopted.—Types were first made in the United States by Christopher Sower of Germantown, Pa., about 1735. He cast several fonts in German and English for himself, and perhaps for others, and the anvil on which he forged his matrices of copper is still to be seen at Germantown. Sower, a publisher of books, was prevented from printing the Bible in English by the patent then held by the university of Oxford. As there was no patent on the Bible in German, he undertook this enterprise, making types, ink, and paper for the purpose, and published the first German edition of the book in America (4to, 1743). Christopher Sower, jr., continued the business, but neither he nor his father can fairly be considered as type founders to the trade. Their type-founding material was bought by Binney and Ronaldson of Philadelphia in 1798, who were materially aided by a grant of $5,000 from the state of Pennsylvania, and by the use of type-founding implements bought by Franklin when he was minister at Paris. Mitchelson, a Scotchman, made types in Boston in 1768, but soon abandoned the business. In 1769 Abel Buell of Killingworth, a silversmith, petitioned the assembly of Connecticut for money to establish a type foundery. He made types at the Sandemanian meeting house in New Haven, but with no benefit to himself or to the printers. William Wing of Hartford, in 1805, made unsuccessful attempts to cast types in conjoined moulds. His partner, Elihu White, established a type foundery at New York in 1810, and afterward at Buffalo and Cincinnati. Robert Lothian, from Scotland, began to make types at New York in 1806. He failed, but many years afterward was succeeded by his son George. John Baine, a type founder of Edinburgh, at the close of the revolutionary war established a foundery at Philadelphia. In 1813 the printers David and George Bruce, who then had the first stereotype foundery in the United States, began business as type founders. George Bruce won a high reputation as a punch cutter and as a scientific type founder.

TYPES, Chemical, a term used to designate the characteristics of chemical substances which are supposed to have an analogous molecular architecture, or are built up of elements which, although unlike, bear a certain relation to each other, by reason of which the materials of one part of the chemical fabric may be replaced by others without altering the general structure. Thus, hydrochloric acid, HCl, may be taken as a type of the chlorides in general, which may be regarded as derived from it by substitution; as for example, chloride of potassium, KCl, when the constituents are both monatomic elements; $BaCl_2$, in which barium is diatomic, and demands two atoms of chlorine; and $SbCl_3$, in which antimony (*stibium*) is triatomic, and requires three atoms of chlorine. The history of the development of the theory of types may be briefly stated as follows: Gay-Lussac observed that wax bleached by chlorine gave up oxygen and absorbed an equal volume of chlorine. Dumas observed the same action with regard to oil of turpentine, and from other observations he was led to the conclusion that a body containing hydrogen, subjected to the action of chlorine, bromine, iodine, or oxygen, takes up an atom of such element for every atom of hydrogen removed. In 1839 he arrived at a "theory of types," which may be enunciated as follows: 1. The elements of a compound may, in numerous cases, be replaced in equivalent proportions by other elements, and by compound bodies which play the part of elements. 2. When this substitution takes place in equal numbers of equivalents, the body in which the substitution occurs retains its chemical type, and the elements which have entered into it play therein the same part as the element which has been abstracted. The chemical type included bodies containing the same number of atoms of their elements, and resembling each other in their principal chemical properties, such as chloroform, bromoform, and iodoform. But when the number of elements varied while the number of atoms of the substance remained the same, they were regarded as belonging to the same molecular type, as marsh gas, CH_4, formic acid, CH_2O_2, chloroform, $CHCl_3$, and chloride of carbon, CCl_4. Berzelius opposed this theory, holding that acetic acid and trichloroacetic acid, which Dumas regarded as belonging to the same type, did not so belong, but that acetic acid is an oxide of a radical, while trichloroacetic acid consists of oxalic acid copulated with chloride of carbon; and so of other substitution compounds. But to maintain this position it was necessary to invent many radicals for compounds which were evidently analogous; and therefore when Melsens showed that acetic can be produced from trichloroacetic acid by the action of sodium amalgam, the idea that these two bodies were not built upon the same type could no longer be maintained. Gerhardt, by the introduction of his "theory of residues," reconciled the radical and substitution or type theories by supposing that a radical can be substituted for an element in a compound without altering the type; not, however, by direct substitution, but by the formation of a body of elements from each of the bodies brought together, by which residues are formed that subsequently unite. The discovery of the alcoholic ammonia bases by Wurtz and Hofmann in 1850, by which it was shown that the hydrogen in ammonia, NH_3, may be replaced by equivalents of the radicals ethyle and methyle, favored the union of the two theories. This conclusion was still further strengthened in the same year by Williamson's explanation of the general relations of the ethers and alcohols by referring them to the type of water, H_2O. Four principal types are now recognized, which are illustrated by the union of one, two, three, and four molecules of a monatomic element respectively with another monad, dyad, triad, or tetrad, as HH, OH_2, NH_3, CH_4; and nearly all organic compounds may be regarded as formed by a combination of two or more of these types. The same compound may often be referred to different types. Thus, trichloride of phosphorus, PCl_3, may be formed from three molecules of hydrochloric acid, 3HCl, by the substitution of one molecule of the triad phosphorus for three hydrogen monads; or from one molecule of ammonia, NH_3, by the equivalent substitution of phosphorus for hydrogen.

TYPE-SETTING MACHINE. See PRINTING.

TYPE WRITERS, mechanical contrivances for writing or printing with a system of movable types instead of a pen. They involve: 1, a position movement, for bringing type to a printing point; 2, an inking device; 3, an impression movement; and 4, a device for letter and line spacing. These elements have been combined in a variety of ways. The most primitive is that in which the types are engraved on a cylindrical bar, which bar is revolved on its axis and also moved backward or forward by the hand of the operator, to present the desired type to the common printing point. This bar is then depressed, thereby delivering the impression through a saturated ribbon upon a sheet of paper wrapped around a cylinder placed at right angles with the type-carrying impression bar. To the paper cylinder a rotary and a longitudinal movement are imparted for the purpose of accomplishing the letter and line space. Nearly the reverse of this is the machine in which the types are arranged on a sliding rod or a narrow bed, and the impression is given by a bar or lever, the impression point of which is equal in size to the face of a letter. This machine was designed to form wax matrices for stereotype moulds, but can be used for printing by interposing paper and inking ribbon between the type and the impression bar. A combination of the essential elements of these two machines was patented in the United States in 1868, the types being arranged on a plate in parallel rows, and the impression given by a plunger or striker. All necessary movements in this machine are accomplished by mechanical means, the operator being simply required to move or depress a key corresponding to the letter desired to be printed. Another class of type writers may be generally described as consisting of a letter wheel or disk, on the periphery of which the types are engraved, which type wheel is revolved on its axis for the purpose of presenting the desired letter to the printing point, after which either paper or wheel is moved to give the impression. Another method of type writing is by means of a section of a globe or hemisphere, having a series of perforations from circumference to centre, in which are placed sliding plungers. On the inner end of each plunger is engraved a type, and on the outer end, upon a button or knob, the corresponding letter. These plungers are directed toward a common centre or printing point, and the paper is fed past this point to produce the letter and line space. The principal mechanical device of another type-writing machine consists of an arrangement of key levers of varying lengths, which levers are made to pass each other and present their type-bearing ends at a common printing point.—The Sholes and Glidden type writer consists of a series of swinging type bars of equal length, pivoted on the circumference of a circle, in such manner that their type-bearing ends, when brought to the printing point, will strike at the centre of the circle. By this means a series of type bars of uniform length are caused to present their type at a common printing point. The paper is fed past this point, to accomplish the letter and word spacing, by the longitudinal movement of a paper car, bearing a cylindrical platen, which platen is moved upon its axis a certain distance to accomplish the line spacing. The movement of the paper car past the printing point is effected by a spring escapement, and governed by a bale or lever which is moved by the depression of any key. Fig. 1 represents a front view of the Sholes and Glidden type writer, with working parts exposed. A saturated inking ribbon is interposed between the type and paper, and is moved automatically through the slots shown on each side of the disk.—A type writer recently invented by L. S. Crandall of New York consists mainly of a vibrating platen and paper feed arranged in connection with a series of type bars, which are provided with more than one type and operated by oscillating finger levers in such manner that, according to the backward or forward motion of the same, two adjoining types are printed on a common centre. The number of centres may be increased, in proportion to the number of types on the bars, by definite vibrations of the platen. For example, if there are six types on a bar, two of them are brought to the printing point in the manner above stated, and to utilize the remaining four one forward and one backward vibration of the platen is required. The types are placed on eight bars, arranged in the segment of a circle, and connected with eight finger cups by oscillating levers. Two thumb keys, with connecting mechanism, effect the transverse movements of the platen. The longitudinal movement of platen, for accomplishing the letter space, is by common means. This machine, being operated by the fingers without changing position of hands, may be used by the blind with facility, but the reading requires sight. In fig. 2, 1 represents a side elevation, showing the arrangement of its principal elements; 2 and 3 are detail side views of the finger lever and type bar, showing their duplex motion. The type bars A are so connected with the finger levers B, and stationary supporting arms C, that a double action may be imparted to them simultaneously with their swinging motion toward the printing points. The double action throws the lever a fixed distance in a forward or backward direction, and thereby admits the use of two types on each type bar for each printing point or centre. The double action of the type bar is produced by projecting cams or shoulders, D, which, by the forward or backward oscillation of the finger levers, are thrown into contact with corresponding projections or recesses, E F, of the fixed arm C, so as to define the extent of movement required for the coupled pair of types to strike their printing point on the platen, G.—In the "Zachos steno-phonotype reporter" the types are placed on twelve shuttle bars, according to a definite scheme, and two or more of the bars may be placed in position simultaneously. The impression is given by a plunger or platen common to all the shuttle bars. By his scheme any monosyllabic word of the English language may be produced at one impression.

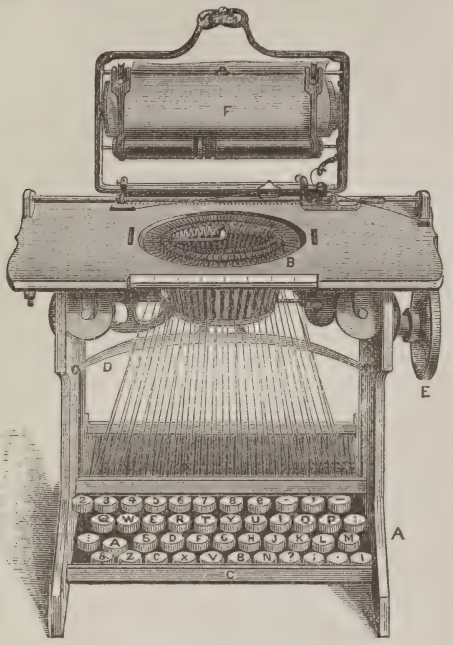

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Fig. 1.—Sholes and Glidden Type Writer.
A. The bank of keys. B. Type-lever disk, showing one lever in printing position. C. Space bar. D. Space bale and yoke. E. Wheel and axle for return of paper car. F. paper car turned back upon its hinge to expose printing.

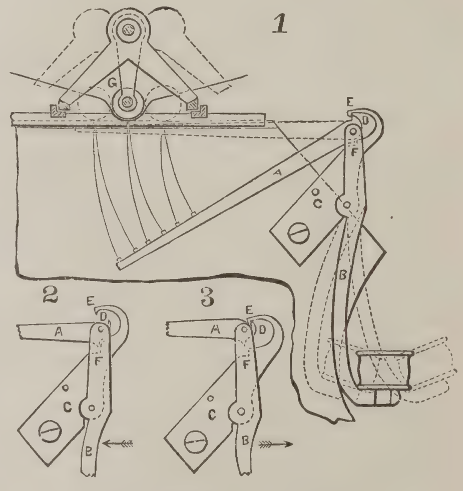


Fig. 2.—Crandall's Type Writer.

TYPHA (Gr. τῖφος, a fen), a genus of monocotyledonous plants, growing in fenny or marshy places, in this country popularly called cat-tail, and in England bulrush (a name here given exclusively to *scirpus*) and also reed-mace. With one other genus (*sparganium*) this makes up the small family *typhaceæ*, which in a systematic arrangement is grouped with the aroids. Typhas are found in most parts of the globe. They have perennial creeping rootstocks, sessile, linear, and nerved leaves, and monœcious flowers, crowded in a spike at the end of the stem; the flowers have neither calyx nor corolla, their place being supplied by numerous long hairs; the upper part of the spike consists of stamens only, intermingled with hairs, and the lower and more dense portion is made up of minute pistils, surrounded by and closely packed in numerous brown hairs; the ovary ripens into a small one-seeded nut, upon a stalk, surrounded by the copious down of the enlarged hairs. The best known species is the common or broad-leaved cat-tail (*typha latifolia*), found all over this and nearly all other countries; it is often 8 or 10 ft. high, and in some localities occupies the marsh to the exclusion of all other vegetation. The leaves are flat, and the spike is a foot or more long, with no interval between the staminate and pistillate portions; the stamens, when they have performed their office, fall away, leaving the upper portion of the stem bare. Our only other species is the small or narrow-leaved cat-tail (*T. angustifolia*), which is much smaller; the leaves are narrower, and channelled at the base; the spikes are more slender, with usually a space, often an inch long, between the pistillate and staminate portions; the two grow together, though this is much the less common, and all the characters which distinguish them are variable. In autumn the spikes disintegrate, and in localities where the plants abound the air is annoyingly filled with the copious down. The dried down has been used in beds as a substitute for feathers; but unless the ticking is very tight, or waxed on the inside, the hairs will work through and annoy the sleeper. At present it is largely manufactured into a non-conducting covering for steam pipes and boilers. The quantity of foliage produced by these plants in favorable localities is immense, and it now nearly all goes to waste; unsuccessful attempts have been made to utilize it as paper stock. In France, where it is called *massette*, the leaves of cat-tail are used in the nurseries as a ligature in budding.

Cat-tail (Typha latifolia).

TYPHOID FEVER. See FEVERS, vol. vii., p. 167.

TYPHON, in Greek mythology, the personification of volcanic phenomena and violent winds. The common account made Typhon the son of Tartarus and Gæa, destined to revenge the defeat of the Titans by the Olympian gods. According to Pindar, his head reached to the stars, his eyes darted fire, his hands extended from the east to the west, terrible serpents were twined about the middle of his body, and 100 snakes took the place of fingers on his hands. Between him and the gods there was a dreadful war. Jupiter finally killed him with a flash of lightning, and buried him under Mt. Ætna.—For Typhon (or Set) in Egyptian mythology, see DEMONOLOGY, vol. v., p. 794, and OSIRIS.

TYPHOON. See HURRICANE.

TYPHUS. See FEVERS, vol. vii., p. 166.

TYRANT, in ornithology. See KING BIRD.

TYRE (in classical writers, *Tyrus;* in the Hebrew Scriptures, *Tzor*, rock), the wealthiest and most powerful city of Phœnicia, founded by the Sidonians, in a naturally strong position on the coast of the Mediterranean, 23 m. S. of Sidon. In later times it extended over a small adjacent island, the new part gradually becoming the more important, and the old receiving the name of Palætyrus or Old Tyre, now called Ras el-Ain. The latter is designated in the historical books of the Old Testament as the "stronghold" or "fortress" (*mibtzar*) Tzor, while, no doubt in allusion to its insular part, the city is called by Isaiah the "stronghold of the sea," and described by Ezekiel, in his glowing picture of its wealth, splendor, and maritime power, as situated "in the heart of the seas." On its site now stands a poor village called Sur. The island on which the town stood was originally severed from another small island bearing the temple of Melkart; but when the latter was rebuilt by Hiram, the little arm of the sea between the two islands was filled up, and by means of embankments toward the south the extent of the island was more than doubled. On the land thus obtained was built a new quarter of the city, which the Greeks called Eurychoron. Tyre was protected on all sides by dikes, and surrounded by fortified enclosures. Hiram built a palace in this insular town, which constantly grew in importance, while Palætyrus was neglected and became comparatively insignificant. Both parts withstood a long siege by the Assyrians (under Shalmaneser according to Josephus, but more probably under Sargon), but only that built on the island is believed to have successfully resisted a longer one by Nebuchadnezzar; while Alexander the

Great, by the construction of a mole from the mainland to the island, succeeded in reducing the whole of Tyre. This mole, gradually enlarged and strengthened by ruins and alluvial deposits, has since permanently connected the two sites of the ancient city, converting the island into a promontory. Even the ruins of the "daughter of Sidon" and mother of Carthage have mostly been covered by the sea. The burial places still testify to the existence of the ancient city. Most of the tombs are rock-cut and subterranean. They contain generally more than one chamber, in the walls of which are recesses holding embalmed corpses in coffins. There are also the ruins of a Christian cathedral, which Eusebius dedicated in 324 and describes in his ecclesiastical history. It was restored by the crusaders, and in it were placed the remains of the emperor Frederick Barbarossa. An earthquake destroyed the rebuilt town in the beginning of the 13th century. In 1874 the tract of land on which the cathedral was situated was purchased by the German government for the purpose of excavating it, and the edifice has been partly unearthed. (For the history of Tyre, see PHŒNICIA.)

Ruins of Tyre.

TYROL (Ger. also *Tirol*), a crownland or province of Cisleithan Austria, bounded N. by Bavaria, E. by Salzburg and Carinthia, S. by Italy, and W. by Switzerland; area, including Vorarlberg, 11,325 sq. m.; pop. in 1870, 885,789, nearly two thirds of German and the rest of Italian descent, and all Roman Catholics. The principal towns are Innspruck, the capital, Brixen, Trent, Bregenz (in Vorarlberg), and Botzen, the first four respectively the capitals of the four circles into which the province is divided. It is as mountainous and picturesque as Switzerland, being traversed by several chains of the Alps. The northern chain is known as the Tyrolese or German, and the southern as the Trent Alps, the latter joining on the east the Carnic Alps. The Rhætian Alps, which occupy the centre, and are the loftiest mountains in Austria, embrace the Ortlerspitze (12,800 ft.), on the confines of Tyrol, Italy, and Switzerland, terminate in the N. E. part of Tyrol; and the Gross-Glockner (about 12,500 ft. according to the latest measurements), the highest point of the Noric Alps, rises on the confines of Tyrol, Carinthia, and Salzburg. Many of the summits are above the line of perpetual snow, and more than 150 sq. m. is covered with glaciers. These chains are crossed by some of the lowest Alpine passes, the best known being the Brenner pass, traversed by the railway from Innspruck to Botzen. The Inn and Adige are the largest rivers besides the Rhine, which separates Vorarlberg from Switzerland. Lakes Constance and Garda are partly in the province, on the N. W. and S. W. borders respectively. The climate is generally severe except in the south. About one third of the whole surface is covered by perpetual snows, glaciers, and barren rocks, and an equal space by forests; the rest consists of pasture and arable land. The total value of landed property in 1870 was estimated at about 300,000,000 florins, and of cattle at 23,500,000 florins. Maize and other grain, fruit, wine, and silk are produced. Goats and sheep abound, as well as the chamois, hares, marmots, and eagles. The minerals include gold, iron, copper, lead, and coal. Lace, embroidery, gloves, hardware, and toys are made, and there is an active transit trade and general commerce. About 30,000 Tyrolese annually migrate in summer and return in autumn. The country is rich in schools, including a university at Innspruck. The Tyrolese are a fine-looking race, wearing picturesque costumes, and are noted for their national songs, piety, patriotism, and industry.—In early times the country was inhabited by Rhætian and Celtic tribes. Under the reign of Augustus it became part of Rhætia. (See RHÆTIA.) Subsequently it was occupied successively by various races, and was ultimately divided into petty states or lordships, tributary to the dukes of Bavaria, among which the duchy of Meran was the most important. These were finally united, and in 1364 were annexed to the duchy of Austria by Duke Rudolph IV., to whom Margaret, surnamed Maultasch, the heiress of Tyrol, had ceded her rights. After various changes Tyrol was inherited in 1490 by Maximilian, the future emperor of Germany, and after new changes finally reunited with the main line of the house of Austria in 1665. By virtue of the treaty of Presburg (Dec. 26, 1805), the country passed into the possession of Bavaria. This gave rise to the insurrection under Andreas Hofer in 1809, during which the women fought by the side of the men, and hundreds of them were slain. (See HOFER.) Austria recovered Tyrol in 1814. The local constitution dates from 1861. The diet consists of 68 members, including the prince-archbishop of Salzburg, whose jurisdiction extends over part of Tyrol, the two prince-bishops of Trent and Brixen, the rector of the university, 4 clerical delegates, 10 of the landholding aristocracy, 13 of large cities, 3 of chambers of commerce and industry, and 34 of rural communities. They are elected for six years. The president of the diet is appointed by the emperor. Vorarlberg has its own constitution and diet. The Tyrol diet elects 10 members to the Reichstag. The Italian or Welsh Tyrolese, who inhabit the southern districts, favor a union with Italy, but Garibaldi's attempt in 1866 to wrest these districts from Austria proved abortive. The ultramontane party preponderates excepting in some of the larger cities, and recent attempts to diminish the influence of the clergy encountered a violent opposition.—See Hormayr, *Geschichte der gefürsteten Grafschaft Tirol* (2 vols., Tübingen, 1806–'8), and *Das Land Tirol und der Tirolerkrieg von* 1809 (2 vols., Leipsic, 1845); Egger, *Geschichte Tirols von den ältesten Zeiten bis in die Neuzeit* (2 vols., Innspruck, 1872–'4); Miss R. H. Busk, "The Valleys of Tyrol" (London, 1874); H. Baden Pritchard, "Tramps in the Tyrol" (London, 1874); Steub, *Drei Sommer in Tyrol* (3 vols., enlarged ed., Stuttgart, 1875); and W. A. Baillie Grohman, "Tyrol and the Tyrolese" (London, 1876).

TYRONE, a N. county of Ireland, in the province of Ulster, bordering on Lough Neagh, which separates it from Antrim, and the counties of Armagh, Monaghan, Fermanagh, Donegal, and Londonderry; area, 1,260 sq. m.; pop. in 1871, 215,668. The chief towns are Strabane, Dungannon, and Omagh, the capital. The surface is greatly diversified, and has many fertile plains and valleys. The only considerable rivers are the Foyle and Blackwater. Coal is found, but turf is the usual fuel. The Londonderry and Enniskillen railway passes through Tyrone near Strabane.

TYRRELL, an E. county of North Carolina, bordering on Albemarle sound, and bounded E. by Alligator river; area, about 350 sq. m.; pop. in 1870, 4,173, of whom 1,302 were colored. The surface is level and the soil sandy. A large portion of the county is covered with swamps and heavy forests of pine, cypress, and red cedar; and shingles, staves, tar, and turpentine are extensively exported. The chief productions in 1870 were 105,308 bushels of Indian corn, 22,544 of sweet potatoes, 507 bales of cotton, and 17,894 lbs. of rice. There were 306 horses, 2,478 cattle, 1,539 sheep, and 4,664 swine. Capital, Columbia.

TYRTÆUS, a Greek poet of the 7th century B. C., a native of Attica or of Lacedæmon. An ancient tradition recounts that, in the second Messenian war, the Spartans were commanded by an oracle to apply to the Athenians for a leader. In answer the Athenians sent Tyrtæus, a schoolmaster of low family and reputation, and deformed, as the most unfit person they could select for the purpose; but he so inspired the Spartans with his war songs, that the Messenians were subdued. His poems were of two kinds: marching songs in anapæstic measures, to be sung with the music of the flute, and elegiac exhortations to constancy and courage. The fragments of them are in Gaisford's *Poetæ Minores Græci* (translated into English verse by Polwhele, 1786–'92), and in Bergh's *Poetæ Lyrici Græci* (3d ed., Leipsic, 1866). They have been newly collected and annotated by A. Lami (Leghorn, 1874).

TYRWHITT, Thomas, an English author, born in London, March 29, 1730, died there, Aug. 15, 1786. He graduated at Oxford in 1750, and in 1756 was appointed under secretary of war, and in 1762 clerk of the house of commons. He resigned office in 1768. Two years previous to his death he was appointed a curator of the British museum. His principal works in English are "Observations on some Passages in Shakespeare" (8vo, Oxford, 1766), and an edition of Chaucer's "Canterbury Tales," with an "Essay on his Language and Versification, an Introductory Discourse, and Notes" (5 vols. 8vo, London, 1773–'8). He aided in the publication of Chatterton's "Poems by Rowley," and supported the authorship of them by Chatterton. He also published in Latin notes, animadversions, and conjectures on writings by Plutarch, Babrius (the supposed author of Æsop's fables), Æschylus, Euripides, Aristophanes, Strabo, and others. His principal work in this department of literature was an edition of Aristotle's "Poetics," published posthumously in 1794.

TYTLER. I. William, a Scottish author, born in Edinburgh, Oct. 12, 1711, died Sept. 12, 1792. He was a writer to the signet, but his reputation rests chiefly upon his "Historical and Critical Enquiry into the Evidence produced by the Lords of Murray and Morton against Mary Queen of Scots" (Edinburgh, 1760; enlarged ed., 2 vols. 8vo, London, 1790); and he edited the "Poetical Remains of James I." (Edinburgh, 1783). **II. Alexander Fraser,** a Scottish jurist, son of the preceding, born in Edinburgh, Oct. 15, 1747, died there, Jan. 5, 1813. He was called to the bar in 1770, and became professor of universal history in the university of Edinburgh in 1786, judge advocate of Scotland in 1790, and judge of the court of session, with the title of Lord Woodhouselee, in 1802. He published a "Supplement to Lord Kames's Dictionary of Decisions to 1778" (Edinburgh, 1778; 2d ed., to 1796, 1797); "Plans and Outlines of a Course of Lectures on Universal History, Ancient and Modern" (1782); "Essay on the Principles of Translation" (1791); "England Profiting by Example" (1799); "Essay on the Military Law and the Practice of Courts Martial" (1800); "Elements of General History" (1801); "Memoirs of the Life and Writings of Henry Home of Kames" (2 vols. 4to, 1807); and "Historical and Critical Essay on the Life and Writings of Petrarch" (1810). His lectures were posthumously published under the title "Universal History, from the Creation of the World to the Beginning of the Eighteenth Century" (6 vols. 18mo, London, 1834–'5). **III. Patrick Fraser,** a Scottish author, son of the preceding, born in Edinburgh, Aug. 30, 1791, died in Malvern, England, Dec. 24, 1849. He was admitted to the faculty of advocates in 1813, and after practising law for several years devoted himself to literature. In 1844 he received a government pension of £200 a year for literary services. He published "Life of James Crichton of Cluny, commonly called the Admirable Crichton" (Edinburgh, 1819); "Life and Writings of Sir Thomas Craig of Riccarton" (1823); "Life of John Wicklyff" (1826); "History of Scotland, 1149–1603" (9 vols., 1828–'43); "Lives of Scottish Worthies" (3 vols., 1831–'3); "Historical View of the Progress of Discovery on the more Northern Coasts of America" (1832); "Life of Sir Walter Raleigh" (1833); "Life of King Henry VIII." (1837); and "England under the Reigns of Edward VI. and Mary, with the Contemporary History of Europe" (2 vols., 1839).

TZANA, or **Dembea,** a lake of Abyssinia, in lat. 12° N., lon. 37° 15′ E., in a fertile grain-producing region, 6,110 ft. above the sea. It is 50 m. long, 25 m. wide, has a depth in some places of 600 ft., and contains several islands, some of which are inhabited. It receives numerous streams, and is traversed in the S. part by the Abai, the Nile of Bruce.

TZAR. See Czar.

TZARSKOYE SELO (Rus., "the czar's village"), or **Sofia,** a town of Russia and the imperial summer residence, in the government and 15 m. S. of the city of St. Petersburg; pop. about 12,000. It grew out of a country house and park of Peter the Great. The present palace was built in 1744 by the empress Elizabeth, and embellished by Catharine II. The main façade, besides the side wings, is nearly 800 ft. long. The high walls of the banquet hall and other rooms are resplendent with gold and other precious metals. The ball rooms are among the largest and most gorgeous of the kind anywhere. One room is entirely panelled in amber; another is fitted up in Chinese fashion. The marble gallery communicating with the palace is a stupendous and brilliant structure. The palace grounds extend over a circumference of 18 m., employ 600 persons, and contain some of the most wonderful artificial and natural attractions in the world. They include a Gothic castle with Dannecker's "Christ," monuments of distinguished Russians, a pretty pavilion near the lake, and the arsenal in an English-Gothic red brick building erected by the emperor Nicholas for collections of armor and curious relics. A new and less costly palace was built by Alexander I., and is inhabited in summer by the imperial family. Conspicuous among the many churches is that connected with the palace, with gilded dome and cupolas. On the way to the neighboring Pavlovsk is a triumphal arch which Alexander I. erected to his comrades in the Napoleonic wars. In the same vicinity are imperial villas at Gatchina, Tchesme, and Krasnoye Selo, all, like Tzarskoye Selo, connected by rail with St. Petersburg.

TZSCHIRNER, Heinrich Gottlieb, a German theologian, born at Mittweida, Saxony, Nov. 14, 1778, died Feb. 17, 1828. He studied theology at Leipsic, entered holy orders in 1801, and became professor of theology at Wittenberg in 1805, and at Leipsic in 1809, superintendent at Leipsic in 1815, and prebendary of Meissen in 1818. He was one of the most effective opponents of the Catholic reaction in Germany. His works include a continuation of the church history of Schrökh (2 vols., Leipsic, 1810); *Protestantismus und Katholicismus aus dem Standpunkte der Politik betrachtet* (1822; translated into English, French, and Dutch); *Das Reactionssystem* (1824); *Briefe eines Deutschen an die Herren Chateaubriand, De Lamennais,* &c. (edited by Krug, 1828); *Vorlesungen über die christliche Glaubenslehre* (edited by Hase, 1829); and *Der Fall des Heidenthums* (unfinished; edited by Niedner, 1829).

U

U, THE 21st letter and 5th vowel of the English alphabet. It is not found in the Semitic languages, which have no distinct letters for vowels proper, and was probably originally wanting in the Greek, in which its modern equivalent is *ου*; in the Hebrew its place is supplied by the letter *vav* and in the Armenian by *hiun*, both of which are pronounced sometimes as vowels and sometimes as consonants. In the Latin also it frequently had the force of a consonant, as in the words *uaco*, *uelox*, *silua*, now written *vaco*, *velox*, *silva*. It was in fact constantly confounded with V, and for some time a distinction was made between U vowel and U consonant, the latter name being applied to the character V; and till near the close of the 16th century they were used interchangeably in printing, V sometimes only as the capital and sometimes as the initial letter in all cases, and *u* as the small letter in all cases or only in the interior of words. In the Gothic alphabets the distinction was made much earlier than in the Latin. In the so-called long sound peculiar to the English *u*, as in *dupe*, there is an intimate junction of the sounds of *e* and *oo*, exactly represented by *ew* in *few;* it is expressed in Italian and Spanish by *iu*, as in *fiume* and *ciudad*, and in French by *iou*, as in *Sioux.* In *u* initial, as in *unite*, the *e* is replaced by its liquid equivalent *y*, the pronunciation becoming *yoonite.* In an unaccented syllable, the union of a preceding *d*, *s*, *z*, or *t* with the *y* element of *u* produces the sound of *j*, *sh*, *zh*, or *ch*, as in *verdure*, *tonsure*, *measure*, *azure*, *virtue.* This effect also appears under accentuation in *sure* and its derivatives and *sugar*, and vulgarly in *sumach.* The short sound of *u* in *sup* is peculiar to the English and Dutch, being nearly equivalent to short *o* in most other languages, and to *eu* in French and *ö* in German. The normal sound of *u* in Italian, German, and most other European languages is *oo*, long and short. The latter is heard in the English *bull*, *full*, *pulpit*, &c. The former (as in *boot*) is commonly said to be the sound of *u* after *r*, as in *rule;* but the great majority of educated speakers, at least in the United States, seem to make this nearly identical with the *u* in *dupe.* In French the letter has a sound of its own (that of *e* modified in the direction of *oo*), which cannot be represented in our tongue, and resembling the German *ü.* In some cases in English, and in many more in other languages, *u* when followed by another vowel has the sound of English *w*, as after *q.* In English and French it is silent between *g* and a vowel, while in Spanish it is pronounced before *a;* in the latter again (as usually also in French) it is silent after *q*, for which *c* is substituted when the *u* is to be pronounced, as in *cuestion.* In Italian and German *u* is never silent.—U is interchangeable with *a*, as in the Arabic definite article, which is rendered *ul* and *al*, or in Ger. *Hut*, Eng. *hat;* with *i*, as Lat. *maxumus* and *maximus;* with *o*, as Lat. *dulcis*, It. *dolce;* with the diphthongs *æ* and *oi*, as Lat. *cura*, old form *coira* or *cœra;* with *au*, as Lat. *mus*, Ger. *Maus;* with *e*, as Lat. *Siculus*, Gr. Σικελός, Lat. *tabula*, Ger. *Tafel*, Ger. *Ulme*, Eng. *elm;* with *l*, as Eng. *stout*, Ger. *stolz*, Fr. *autel*, Eng. *altar.* U never occurs in ancient Latin inscriptions, V being used instead.

UBICINI, Jean Henri Abdolonyme, a French author, born in Issoudun, Oct. 20, 1818. He early explored the East, and in 1848 participated in the revolution at Bucharest, and became secretary of the provisional government. Subsequently he settled in Paris. His works include *Lettres sur la Turquie* (2 vols., 1849–'51; English, London, 1856); *La Turquie actuelle* (1855); and *La question des principautés danubiennes devant l'Europe* (1858). He has also translated the *Saturnalia* of Macrobius (1845) and edited the works of Voiture (1856), and for several years the *Revue de l'Orient.*

UCAYALI. See AMAZON, and PERU.

UCCELLO (PAOLO DI DONO), an Italian painter, born in Florence about 1390, died about 1472. He was called Uccello from his predilection for birds. He was the first painter to develop the principles of perspective. He painted principally in fresco. Few of his works remain.

UCHEES, a small tribe of American Indians, first found on both sides of the Savannah river as far down as the Ogeechee. They were civil, orderly, and industrious, and their women were noted for chastity. In the troubles about the time of the Yemassee war they moved to the Chattahoochee, and finally were merged in the Creek confederacy, emigrating with them to the Indian territory. Though long identified with the Creeks, they retain their own language and customs. The former is peculiarly harsh and guttural.

UDALL, Nicholas, an English author, born in Hampshire in 1506, died in 1564. He was educated at Oxford, was master successively of Eton and Westminster schools, and in the early part of the reign of Edward VI. was appointed to a canonry at Windsor. He published "Flovres for Latyne Spekynge" (London, 1533), a series of selections from Terence; some translations from the Latin works of Erasmus; and a Latin tragedy, *De Papatu* (1540). He was probably the first writer of regular English comedies, divided into acts and scenes. Wood says he wrote several, but only one is extant, "Ralph Roister Doister" (reprinted by the Shakespeare society, London, 1847).

UDINE. I. A N. E. province of Italy, in Venetia, embracing the larger portion of the former duchy of Friuli, and bordering on Austria and the Adriatic; area, 2,515 sq. m.; pop. in 1872, 481,586. The chief river is the Tagliamento. The N. part is covered with offshoots of the Alps, and the S. part is marshy; about one half of it is level. Agriculture has made considerable progress during the last 50 years, and the cereals produced in the level districts now suffice for the whole province. In the production of silk Udine occupies the first rank in Italy. It has also marble caves and sulphur springs. The province is divided into 17 districts. **II.** A town, capital of the province, in an extensive plain on the canal of La Roja, 60 m. N. E. of Venice, and 38 m. N. W. of Trieste; pop. about 26,700. It is walled and fortified, and has a fine cathedral, several hospitals, and a monumental pillar by Camalli, erected to commemorate the peace of 1797 concluded at the neighboring village of Campo Formio. The *campo santo* is one of the finest cemeteries in Europe.

UEBERWEG, Friedrich, a German historian of philosophy, born near Solingen, Rhenish Prussia, Jan. 22, 1826, died in Königsberg, June 7, 1871. He completed his studies at Göttingen and Berlin, and was a tutor at the university of Bonn from 1852 to 1862, and subsequently professor of philosophy at Königsberg. His works include *System der Logik und Geschichte der logischen Lehren* (Bonn, 1857; 3d ed., 1868; English translation by Thomas Lindsay, London, 1871), in which he agreed with Trendelenburg in the renewed founding of logic on Aristotelian principles; *Grundriss der Geschichte der Philosophie von Thales bis auf die Gegenwart* (3 vols., Berlin, 1862–'6; English translation from the 4th German ed., "History of Philosophy," by George S. Morris, with additions by President Porter of Yale college, a preface by Professors Henry B. Smith and Philip Schaff, and an appendix on Italian philosophy by Vincenzo Botta, New York, 1872–'4); and a translation of Berkeley's "Principles of Human Knowledge" (in Kirchmann's *Philosophische Bibliothek*, 1869), which gave rise to a controversy.—See *Friedrich Ueberweg*, by Prof. Fr. A. Lange of Zürich (Berlin, 1871).

UFA. I. An E. government of European Russia, bordering on Perm, Orenburg (of which till 1865 it formed the N. W. part), Samara, Kazan, and Viatka; area, 47,031 sq. m.; pop. in 1870, 1,364,925. The Ural mountains constitute the E. frontier; the rest of the surface is hilly or level. It is watered by the Bielaya river, a tributary of the Kama, and its numerous affluents, the most important of which is the Ufa. The region of the Bielaya is the most fertile in the Ural mountains. **II.** A city, capital of the government, at the confluence of the Ufa and Bielaya, built on rocks and surrounded by mountains, 200 m. N. by E. of Orenburg; pop. in 1867, 20,166. It is the seat of a Greek bishop and of a Mohammedan mufti, and has an ecclesiastical seminary, a gymnasium, 12 Greek churches, and a mosque. In January a large fair is held, lasting ten days. Ufa was laid out as a fortress toward the close of the 16th century, and was improved after a conflagration in 1816.

UGGIONE, Marco da. See OGGIONE.

UGOCSA, a N. E. county of Hungary, in the Trans-Tibiscan circle, bordering on the counties of Bereg, Mármaros, and Szatmár; area, 460 sq. m.; pop. in 1870, 67,498, chiefly Ruthenians and Magyars. The N. and E. parts are mountainous. It is intersected by the Theiss. Pastures, forests, and mines abound, and the principal pursuits are cattle raising and fishing. Capital, Nagy-Szöllös.

UGOLINO. See GHERARDESCA.

UGRIANS. See FINNS.

UHLAND, Johann Ludwig, a German poet, born in Tübingen, April 26, 1787, died there, Nov. 13, 1862. He graduated in law at Tübingen in 1810, and from 1812 to 1814 practised at Stuttgart in connection with the ministry of justice. He wrote poetry for periodicals as early as 1806. The war of independence against Napoleon roused his patriotic feelings, and the first collection of his *Gedichte* (1815) was received with great enthusiasm; and over 50 editions, gradually enlarged, have since appeared. In 1819 he became a member of the Würtemberg assembly. He was professor of the German language and literature at Tübingen from 1830 to 1833, when he resigned to take a more active part as a liberal leader in the diet, from which he retired in 1839. In 1848 he was a member of the Frankfort parliament. His works include, besides the above mentioned collection of *Gedichte*, the dramas *Ernst von Schwaben* and *Ludwig der Bayer* (1817–'19; 3d ed., 1863); *Alte hoch- und niederdeutsche Volkslieder* (1844–'5); and *Schriften zur Geschichte der Dichtung und Sage* (8 vols., 1865–'73), comprising his learned works relating to early German and Norse literature and mythology. He had in his days no superior as a lyrical poet. Longfellow has translated some of his pieces. Alexander Platt translated his "Poems" (Leipsic, 1848), W. W. Skeat his "Songs and Ballads" (London, 1864), and W. C. Sanders his "Poems" (1869).—See *Ludwig Uhland, seine Freunde und Zeitgenossen*, by Mayer (2 vols., Stuttgart, 1867); *Uhland's Leben*, edited by his widow (Stuttgart, 1874); and *Uhland und Rückert*, by S. Pfizer (1875).

UIGURS. See TURKS.

UINTAH, the W. county of Wyoming, bounded N. by Montana, S. by Utah, and W. by Utah, Idaho, and Montana; area, about 13,500 sq. m.; pop. in 1870, 856. It is crossed by the Rocky mountains, and contains the sources of the Green, Snake, Yellowstone, and Missouri rivers. It contains deposits of coal. The N. portion is occupied by the Yellowstone national park. (See WYOMING.) The Union Pacific railroad crosses the S. part. The Uintah mountains lie along its S. border in Utah, projecting E. from the Wahsatch range. Capital, Evanston.

UJIJI, a district of central Africa, on the E. shore of Lake Tanganyika, about half way between its centre and N. extremity, bounded N. by the district of Urundi, E. by Ubuha, S. by Ukaranga, and W. by the lake. The surface is hilly, the soil exceedingly fertile, and the climate humid. It is one of the most productive districts in the region. The principal crops are ground nuts, peas, beans, haricots, and holcus; but sugar cane, tobacco, and cotton are sometimes raised. Among the fruits are the Guinea palm and the plantain, and among the vegetables are the sweet potato, yam, egg plant, manioc, and cucumber. The inhabitants, the Wajiji, are a large, strong race, with dark skins, which they tattoo, woolly hair, and large flat feet and hands. What is generally called the town of Ujiji, or Kawele, is a collection of huts and mud hovels on the shore of the lake (lat. 4° 58′ 3″ S., lon. 30° 4′ 30″ E.), around a raised plot of ground called the bazaar, where the coast Arabs come to trade. It was here that Stanley found Livingstone, Nov. 10, 1871.

UKRAINE (Pol. *Ukraina*, border land), formerly the name of a S. E. province of independent Poland, on both sides of the Dnieper, and bordering on the Tartar territories. In later times it was divided into Polish and Russian Ukraine. Since 1793 it has wholly belonged to Russia, and it is now identical with Little Russia, comprising the governments of Kiev, Tchernigov, Poltava, and Kharkov. (See Cossacks.)

ULEABORG. **I.** The northernmost län of Finland, Russia, bordering on Norway and Sweden; area, 63,955 sq. m.; pop. in 1872, 185,890. It is mountainous, and contains a vast number of lakes and marshes, including Lake Enare. On account of its high latitude, it is little fitted for agriculture. The chief product is berries. The main pursuits are fishing and bird catching. **II.** A town, capital of the län, on a peninsula at the mouth of the Ulea (Swed. *Uleå*) in the gulf of Bothnia, 330 m. N. of Helsingfors; pop. in 1867, 7,602. It has a lighthouse, a fine church, and much industry and trade, in which it ranks next to Abo. On an adjacent island is the old castle of Uleaborg. In 1854 an English fleet destroyed much national Russian property at Uleaborg, as well as at Brahestad, in the same province.

ULEMA (the Arabic plural of *alim*, a learned man), the collective name of the body of learned men in Turkey. In a general sense ulema are persons who are learned in both law and divinity. They form a distinct body in Constantinople, whose office is to watch over the correct interpretation of the Koran and the right application of its teachings to law and polity. The head of the ulema is the grand mufti or *sheikh ul-islam;* next to him come the kaziaskiers, of whom there is one for Europe and one for Asia; the third class are the mollahs, the superior judges in the provinces; and after them are the cadis and the common muftis. (See Cadi, and Mufti.) The kaziaskiers have a voice and vote in the divan, and all cadis are appointed by and subject to them.

ULEX, a genus of much branched, very thorny shrubs of the *leguminosæ*, popularly called furze and gorse, and sometimes whin. The simple leaves are mostly reduced to mere prickles, and the numerous short branches terminate in spines; the axillary, yellow flowers have a calyx deeply divided into two lips, and colored like the petals; the stamens are united to form a complete tube; the pod is few-seeded. There are about a dozen species, natives of Europe and northern Africa; two are found in Great Britain, and others are sometimes cultivated. The common furze (*U. Europæus*) is a very social plant, often covering large tracts, forming a feature in the landscape, and when in flower is very attractive. In exposed situations it is a straggling bush, but in the shelter of woods it grows 10 ft. high, and in southern Europe 18 ft.; it is sometimes seen in collections of shrubbery in this country, but it is difficult to keep in the northern states; in England, though a native, in severe winters it is killed to the ground. The principal use of the plant is as a food for cattle; it has long been the custom in Normandy to cut the tops, and, after passing them through a mill to crush the spines, to feed them in the green state; it is there cultivated for this purpose, as it has been in parts of England, but its intrinsic value as food does not warrant the cost of its cultivation and preparation; its growth is encouraged in England as a game cover. There is a double-flowered variety, and another form with compact and erect branches called Irish furze. Some regard the dwarf or French furze as a variety of the preceding, while others consider it distinct (*U. nanus*); it is much smaller, and has deeper yellow flowers, which appear from August to December, while the other blooms in spring.

Furze or Gorse (Ulex Europæus).

ULFILAS, Ulphilas, Ulfila, or **Wulfila,** a Gothic bishop, born among the Goths in 310 or 311, died in Constantinople about 381. He is believed to have belonged to a family of Cappadocian Christians, whom the Goths had carried into captivity about 267. He was master of the Gothic, Greek, and Hebrew languages, became bishop of the Goths in 341, and in 348, at the head of the Christian minority of his people, and with the permission of the emperor Constantius, he settled in Mœsian territory, near Nicopolis. He persuaded his followers to devote themselves to agriculture and the peaceful arts, while the pagan majority only thought of war. He propagated among his people the love of letters, formed an alphabet of 24 characters based on the Greek, and translated for popular use into Mœso-Gothic the whole Bible except the books of Kings. This version, in which it is thought he was assisted by his friend and successor Senelas, and of which only fragments exist, is the earliest known specimen of the Teutonic language. Among its recent editors and commentators are Gabelenz, Löbe, Massmann, and Stamm. A new edition, by E. Bernhardt, with various readings, a commentary, and critical introduction, together with the Greek text, appeared at Halle in 1876. Ulfilas's Bible was in constant use among the Gothic peoples so long as they preserved their nationality. (See GOTHIC LANGUAGE AND LITERATURE, vol. viii., pp. 124, 125, and ARGENTEUS CODEX.) He was a semi-Arian, subscribed the creed of Rimini in 359, was at the Arian synod of Constantinople in 360, and died while attending the œcumenical council of 381.—See Waitz, *Ueber das Leben und die Lehre des Ulfilas* (1840), and Bessel, *Ueber das Leben des Ulfilas und die Bekehrung der Gothen* (1860).

ULLMANN, Karl, a German theologian, born at Epfenbach, Bavaria, March 15, 1796, died in Carlsruhe, Jan. 12, 1865. He was successively professor at Halle and Heidelberg, and in 1853 became bishop of the state church in Baden, and in 1856 president of the supreme ecclesiastical council, retiring in 1860. He was a friend and adopted the views of Schleiermacher. In 1828 he joined Umbreit in establishing the Protestant quarterly review entitled *Studien und Kritiken*, for which he wrote able essays, afterward enlarged in separate publications. His works include *Gregor von Nazianz* (Darmstadt, 1825); *Historisch oder mythisch?* directed against Strauss's "Life of Christ" (Hamburg, 1838); *Ueber den Cultus des Genius* (1840; English translation, "The Worship of Genius," London, 1846); *Ueber die Reformatoren vor der Reformation* (2 vols., 1841; English translation, "Reformers before the Reformation," by Robert Menzies, 2 vols., Edinburgh, 1855); *Ueber die Sündlosigkeit Christi* (1841; 7th ed., Gotha, 1863; English translation, "Apologetic View of the Sinless Character of Jesus," Edinburgh, 1841); and *Ueber das Wesen des Christenthums* (Hamburg, 1845; 4th ed., Gotha, 1854).

ULLOA, Antonio de, a Spanish naval officer, born in Seville, Jan. 12, 1716, died in the Isla de Leon, near Cadiz, July 3, 1795. He was educated for the navy, became in 1733 a member of the royal marine guards, and in 1735 a lieutenant, when he was sent to South America with the French academicians who were commissioned to measure a degree of the meridian at the equator. From this he was called away to assist in putting the coast in a state of defence against Lord Anson's expedition. In October, 1744, he embarked for Europe, but was captured by the British, and carried to London, where his scientific friends obtained his liberty, and made him a member of the royal society. On his return to Spain in 1746 he wrote a history of the expedition, the scientific portion being written by his companion, Jorge Juan (4 vols., Madrid, 1748; translated into English, "A Voyage to South America," 2 vols., London, 1772; 4th ed., 1806). In 1755 he went a second time to America, and after the peace of 1763 was made governor of Louisiana, where he arrived in March, 1766. An insurrection obliged him to leave the colony, and he returned to Europe. In 1772 he published a volume of essays on the natural history and antiquities of America, and in 1778 "Observations of a Solar Eclipse made at Sea." He was now a lieutenant general in the naval service, and was appointed to the command of a squadron intended to capture off the Azores an English merchant fleet heavily laden, and afterward to sail to Havana and join an expedition fitting out against Florida. Absorbed in his scientific investigations, Ulloa forgot to open his sealed orders, and after cruising about for two months without success returned. He was tried in 1780 by a court martial demanded by himself, and, though acquitted, never again engaged in active service.

ULM, a city of Würtemberg, capital of the circle of the Danube, situated in a fertile valley on the left bank of the Danube at its junction with the Iller and Blau, and at the foot of the E. spurs of the Swabian Alps, 45 m. S. E. of Stuttgart; pop. in 1871, 26,214. The Danube becomes here fully navigable, and forms the boundary between Würtemberg and Bavaria. The town has the quaint and stately aspect of most former imperial cities, and contains many memorable public and private buildings. The *Münster* is one of the most celebrated achievements of early German architecture, and one of the largest Protestant churches in Germany. Its stained glass windows are of remarkable finish, and it has many works of art and a very large organ. The tower, originally designed to be 500 ft. high, only rises to about 250 ft. The edifice has been for some time in process of restoration. The provincial authorities occupy the former palace of the order of Teutonic knights, and there is also a royal palace. The city library, one of the earliest in Germany, contains a collection of remarkable antiquities. Ulm is one of the great commercial centres of Würtemberg, though railway traffic has become a formidable rival of the trade on the Danube. The railways to Stuttgart, Friedrichshafen, Augsburg, Kempten, and Blaubeuern all form a junction at Ulm in a single station. The products include fine flour and pipe bowls, which have a wide reputation. The trade is especially active in deals. —Ulm was formerly an imperial city of the Swabian circle, and held the most prominent place in the Swabian diet. In the 15th century it had more than 50,000 inhabitants, besides 40,000 in the adjoining territory, then belonging to the town. Its wealth became proverbial, but the strategical importance of Ulm involved it in nearly all great German wars. In 1803 it was annexed to Bavaria. The Austrian general Mack surrendered here to Napoleon, Oct. 20, 1805, with his entire army of 23,000 men. Subsequently it was restored to Bavaria, and in 1810 it was allotted to Würtemberg, the former country retaining only the village of Neu-Ulm, on the opposite bank of the Danube. The extensive fortifications of Ulm are situated partly in Würtemberg, partly in Bavarian territory.

ULPIAN (Domitius Ulpianus), a Roman jurist, assassinated at Rome, A. D. 228. He was of Tyrian origin, and during the reigns of Septimius Severus and Caracalla wrote juristical works. When Elagabalus ascended the throne in 218 he was banished, but in 222 he became one of the chief advisers of Alexander Severus, who made him *Scriniorum magister*, *consiliarius*, and *præfectus annonæ*. He also held the office of prætorian prefect. He was killed by the soldiers in the presence of the emperor and his mother. Ulpian was one of the most distinguished of the Roman jurists, and from his works were taken about one third of the excerpts made for Justinian's Digest.

ULRICI, Hermann, a German philosopher, born at Pförten, Lusatia, March 23, 1806. He was educated at Halle and Berlin, and practised law for some time, but in 1829 devoted himself to philosophical studies, and in 1834 became professor at Halle. He was also one of the joint editors of the *Zeitschrift für Philosophie.* His position in philosophy is independent, and he strives to mediate between realism and idealism. His works include *Geschichte der hellenischen Dichtkunst* (2 vols., Berlin, 1835); *Ueber Shakspeare's dramatische Kunst* (Halle, 1839; 3d ed., 1868; English translation by A. I. W. Morrison, London, 1846); *Ueber Princip und Methode der Hegel'schen Philosophie* (1841); *Das Grundprincip der Philosophie* (Leipsic, 1845–'6); *System der Logik* (1852); *Glauben und Wissen, speculative und exacte Wissenschaft* (1858); *Compendium der Logik* (1860; enlarged ed., 1872); *Gott und die Natur* (1862; 2d ed., 1866); *Gott und der Mensch* (1866 *et seq.*); *Zur logischen Frage* (Halle, 1870); and *Der Philosoph Strauss* (1873).

ULSTER, a S. E. county of New York, bounded E. by the Hudson river, and drained by the Esopus, Rondout, and Wallkill creeks; area, 1,204 sq. m.; pop. in 1875, 88,271. The surface is broken by the Catskill and Shawangunk ridges, and the soil is generally best adapted to grazing. Iron ore, limestone, slate, and marl are found, and there are indications of the existence of coal, lead, plumbago, and alum. Large quantities of flagging stone are exported. The Delaware and Hudson canal passes through it, and it is also intersected by the New York, Kingston, and Syracuse railroad. The chief productions in 1870 were 42,532 bushels of wheat, 107,502 of rye, 394,004 of Indian corn, 447,837 of oats, 132,515 of buckwheat, 688,435 of potatoes, 1,631,956 lbs. of butter, 41,595 of wool, and 97,995 tons of hay. There were 8,928 horses, 17,640 milch cows, 12,597 other cattle, 14,119 sheep, and 14,070 swine. There were 690 manufacturing establishments; capital invested, $4,938,201; value of products, $10,213,187. The principal manufactories were 54 of carriages and wagons, 3 of hubs and wagon material, 10 of bricks, 11 of cement, 13 of cooperage, 2 of edge tools and axes, 14 of furniture, 1 of glass ware, 9 of iron, 3 of lime, 4 of machinery, 7 of marble and stone work, 1 of paints, 4 of paper, 5 of woollens, 38 saw mills, 6 breweries, 15 tanneries, and 34 flour mills. Capital, Kingston.

ULSTER, one of the four provinces of Ireland, constituting the N. part of the island, bounded W. and N. by the Atlantic ocean, E. by the North channel and Irish sea, S. E. by Leinster, and S. W. by Connaught; area, about 8,550 sq. m.; pop. in 1871, 1,830,398, nearly half of them Protestants. It is divided into the counties of Antrim, Armagh, Cavan, Donegal, Down, Fermanagh, Londonderry, Monaghan, and Tyrone. The coasts are generally rugged and indented by numerous bays and harbors, the chief of which are Carlingford bay, Dundrum bay, Strangford lough, Belfast lough, Lough Larne, Lough Foyle, Lough Swilly, Mulroy bay, Sheep Haven, and Donegal bay. The principal rivers are the Erne, Foyle, Bann, and Lagan. A considerable part of the surface is mountainous, and two chains traverse the province from E. to W., the highest peaks being in the counties of Donegal and Down; Errigal in the former and Slieve Donard in the latter are respectively 2,460 and 2,796 ft. high. Between these ranges is an extensive tract of undulating ground, near the centre of which is Lough Neagh. Other large lakes are Upper and Lower Lough Erne, and Loughs Melvin, Sheelin, Oughter, Derg, Esk, and Veagh. Ulster is the seat of the Irish linen manufacture, which supports about one fourth of the population. Cotton is extensively manufactured in Belfast and vicinity. Internal communication is facilitated by railways and canals, and numerous excellent roads.—Ulster was partly conquered and held as an earldom under Henry II. by John de Courcy, from whom it was transferred to Hugh de Lacy; and by descent from him, through the De Burgh and Mortimer families, the title was merged in the crown of England under Edward IV. James I. colonized Ulster with Scotch and English Protestant settlers, to whom he gave grants of land in lots of 1,000, 1,500, and 2,000 acres. The insurrection of 1641 was to overthrow these Protestant settlements. Several towns were taken, the country was devastated, many thousand lives were sacrificed, and it was not till 1649 that the rebellion was completely quelled.

ULTRAMARINE, a beautiful blue pigment originally made from lapis lazuli (see Lapis Lazuli), but now prepared in large quantities artificially. Its fabrication was suggested by the discovery of blue masses on taking down soda furnaces and lime kilns; and the *société d'encouragement* at Paris in 1824 offered a prize of 6,000 francs for its production, which was awarded to Guimet of Toulouse in 1828. A mode of preparation had previously been published by Christian Gmelin, in the beginning of the same year. Guimet's process was first applied on the manufacturing scale, but was kept secret. Gmelin's process was long followed, but many others have finally come into use. The following process, given by Prof. Miller of London, answers well upon a small scale: An intimate mixture of 100 parts of finely washed kaolin, 100 of sodic carbonate, 60 of sulphur, and 12 of charcoal is exposed in a covered crucible to a bright red heat for three hours and a half. The residue, which should not be in a fused condition, is green. The product after grinding is well washed, dried, and mixed with one fifth of its weight of sulphur, and exposed in a thin layer to a gentle heat a little above that required to burn off the sulphur, which being accomplished the process is repeated two or three times, until the mass becomes bright blue. The green modification, the product of the initial process, is also manufactured for the market. There is some doubt as to the nature of the coloring matter of ultramarine. According to the experiments of Wilkens, ultramarine is composed of two portions, one constant, containing the coloring matter and soluble in hydrochloric acid, while the other contains a variable amount of clay, ferric oxide, and sulphuric acid.

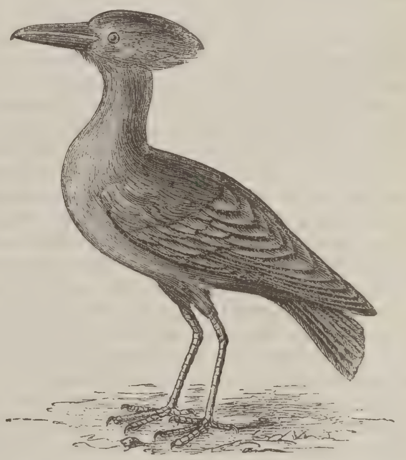
ULTRAMONTANISTS (Lat. *ultra montes*, beyond the mountains), the name formerly applied to all theologians in the Roman Catholic church who advocated the highest spiritual and temporal power of the papacy, and bestowed since 1870 on all who accept the decrees of the Vatican council. The name originated with the French Gallicans, who denied to the popes all right to depose sovereigns or to interfere in the temporal affairs of states and of national churches, and maintained that the doctrinal judgments of the popes only become infallible and binding on the conscience when confirmed by the consent of the church, and that the authority of a general council is superior to that of the pope. The contrary view being held "beyond the Alps" and throughout Italy, its supporters were called *Transalpini* and *ultramontani*. At the council of Constance, where these adverse opinions came conspicuously into conflict, the designation of ultramontane was extended to persons of every nationality who denied the superiority of the council over the pope. After that council the question of the direct or indirect power of the papacy over states and sovereigns became the chief point of dispute, and the question everywhere assumed a national character. In Germany Febronius (Bishop Hontheim) wrote a powerful work against ultramontanism; and in 1786, at the convention of Ems, the archbishops of Mentz, Treves, Cologne, and Salzburg denounced it. In Italy its chief opponent in the last century was Scipione Ricci, bishop of Pistoja, who convened a synod in that city in September, 1786, and promulgated disciplinary decrees and a doctrinal exposition favoring extreme Gallicanism and Jansenism. These were partly confirmed, April 23, 1787, by an assembly of the bishops of Tuscany; but the grand duke, who had been the chief promoter of these measures, having become emperor as Leopold II. in 1790, allowed his successor to restrain and punish Ricci and his followers. The acts of the synod of Pistoja were condemned by Pius VI. in the dogmatic bull *Auctorem fidei* of Aug. 28, 1794. The political aspects of ultramontanism were once more brought into prominent notice in 1869-'70 in connection with the council of the Vatican and the doctrine of papal infallibility. Since then the tendencies of ultramontanism in its bearings on civil allegiance have been vehemently discussed, especially in Germany, Switzerland, Italy, and England.

ULYSSES, or **Odysseus** (Gr. 'Οδυσσεύς), one of the Greek leaders at the siege of Troy. According to the Homeric account, he was the son of Laërtes and Anticlea, and married Penelope, the daughter of Icarius, by whom he had a son named Telemachus. He ruled in Ithaca, and only with great difficulty could be induced to join the expedition against Troy. According to one form of the legend, he simulated insanity to avoid taking part, and ploughed the sand on the beach; Palamedes exposed the deception by placing his infant son Telemachus in the furrow, at which Ulysses turned the plough aside. The falsity of his madness being thus disclosed, he joined the Grecian fleet at Aulis with 12 ships, and when the expedition had reached Tenedos was sent with Menelaus to Troy to demand Helen and the stolen property. The mission was unsuccessful. In the ten years' war he was distinguished for his prowess as a warrior, but far more for his eloquence, sagacity, and inexhaustible resources under difficulties. After the death of Achilles his armor was offered as a prize to the greatest warrior in the Greek army, and Ulysses and Ajax became rivals for the honor, the former proving successful. By his contrivance the Palladium was carried away from Troy by stealth, and he was one of the heroes concealed in the wooden horse which the Trojans to their ruin introduced into the city. His ten years' wanderings after the close of the siege form the subject of the Odyssey. After various adventures he was thrown upon the coasts of the Lotophagi, where his companions, having eaten of the lotus, wished to remain. But he induced them to depart, sailed to the island of the Cyclops, and with 12 of his followers entered the cave of Polyphemus, who devoured six of his companions. Ulysses made the giant drunk with wine, put out his one eye with a burning pole, and then tying himself and his companions under the bodies of the sheep, escaped when these were let out of the cave. Polyphemus implored his father Neptune to visit Ulysses with his vengeance, and the remainder of his voyage was constantly disturbed. Reaching the island of Æolus, Ulysses was presented by that deity on his departure with a bag containing the winds that were to bring him home; but his followers opened the bag without his knowledge, the winds escaped, and the vessels were driven back to the island. After six days he reached the country of the cannibal Læstrygones, from which he escaped with only one ship. Thence he sailed to Ææa, inhabited by the sorceress Circe, who changed part of his followers into swine. Through the aid of Mercury he overcame her spells, and his companions resumed their human shape. Circe now treated them kindly, and by her advice Ulysses descended into Hades to consult the seer Tiresias. The prophet assured him that everything would turn out right if the herds of Helios in Trinacria should be left unharmed. Returning to Ææa, he was carried to the island of the sirens, but by filling the ears of his companions with wax and tying himself to the mast he passed them in safety. His ship then came between Scylla and Charybdis, and the monster Scylla carried off and devoured six of his companions. Coming to Trinacria, he was compelled by his companions to land. There they were detained by storms, and while he was sleeping some of the finest of the cattle of Helios, which they had sworn not to touch, were killed and eaten by his followers. As soon as they were again on the open sea, another storm arose, and the vessel was destroyed by lightning, all on board being drowned except Ulysses. He was carried to the island of Ogygia, inhabited by the nymph Calypso, who promised him immortality and eternal youth if he would marry and remain with her. But after a stay of seven years he embarked on a raft, and reached Scheria, from which place he was sent to Ithaca in a ship, having been absent 20 years. He found his wife beset by suitors (see PENELOPE), all of whom he slew with the aid of Minerva and his son Telemachus. Of his later life and of his death there are different accounts. In one, his son Telegonus by Circe, being sent to look for his father, and being shipwrecked on Ithaca and beginning to plunder for the sake of obtaining food, was attacked by Ulysses and Telemachus, and in the contest that followed Telegonus slew his own father.

UMATILLA, a N. E. county of Oregon, bordering on Washington territory, bounded N. W. by the Columbia river and E. by the Blue mountains, and watered by the Umatilla river and other streams; area, 5,300 sq. m.; pop. in 1870, 2,916, of whom 70 were Chinese. The river valleys are fertile; back of these are rolling prairies and high table lands covered with pasturage, and beyond these hills well wooded with pines. Gold is mined in the mountains and on the bars of the Columbia. Coal, copper, and iron are also found. The chief productions in 1870 were 28,209 bushels of wheat, 9,789 of Indian corn, 56,634 of oats, 11,782 of barley, 26,413 of potatoes, 97,564 lbs. of wool, 72,730 of butter, and 3,394 tons of hay. There were 13,712 horses, 7,317 milch cows, 9,240 other cattle, 29,960 sheep, and 2,027 swine. Capital, Pendleton.

UMBER, a pigment much used by artists for brown and grave colors. It is made from an argillaceous brown hematite having the formula $2Fe_2O_3,3H_2O$, by roasting, pulverizing, and mixing it with variable proportions of clay or ochre, and sometimes with a little oxide of manganese, or it may be used alone. Ordinary roasting does not drive off all the water, and in this state it is called raw umber. When strongly heated it is completely dehydrated, and is called burnt umber. It is used both in oil and water colors, and is often mixed with other pigments.

UMBRE, a wading bird of the heron family, and genus *scopus* (Briss.). The bill is longer than the head, elevated at the base, compressed laterally, keeled above and below, and a little bent at the point; the nostrils prolonged in a furrow; third and fourth quills equal and longest; tail short and even; tarsi longer than middle toe and scaled; front toes united by membrane to first phalanx, the hind one resting wholly on the ground; claws short and slightly curved. The only described species, the tufted umbre (*S. umbretta*, Gmel.), is 20 in. long, with a bill of 3½ in.; the color is a uniform umber brown, the wings and tail barred with darker; the male has an occipital crest about 4 in. long, of loose feathers. It is a native of Africa.

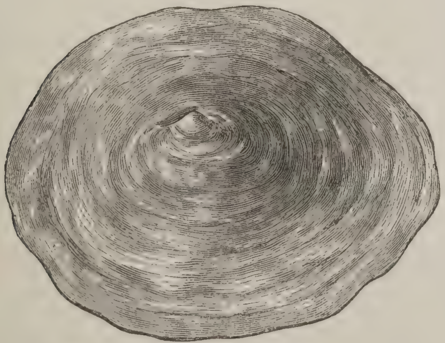


Tufted Umbre (Scopus umbretta).

UMBREIT, Friedrich Wilhelm Karl, a German Protestant theologian, born at Sonneborn, Gotha, April 11, 1795, died in Heidelberg, April 26, 1860. He studied theology at Göttingen, especially under Eichhorn, and wrote a prize essay, *Commentatio Historiam Emirorum-al-Omrah ex Abulfeda exhibens* (Göttingen, 1816). In 1820 he was appointed extraordinary professor of theology and philosophy in Heidelberg, in 1823 ordinary professor of philosophy, and in 1829 ordinary professor of theology. His works include *Lied der Liebe* (Göttingen, 1820); *Uebersetzung und Auslegung des Buches Hiob* (Heidelberg, 1824); *Commentar über die Sprüche Salomos* (Heidelberg, 1826); *Christliche Erbauung aus dem Psalter* (Hamburg, 1835); *Grundtöne des Alten Testaments* (Heidelberg, 1843); and *Commentar über die Propheten des Alten Testaments* (4 vols., Hamburg, 1841–'6), his principal work. He was also, with his friend Dr. Ullmann, editor of the *Studien und Kritiken*, the principal theological quarterly of Protestant Germany.

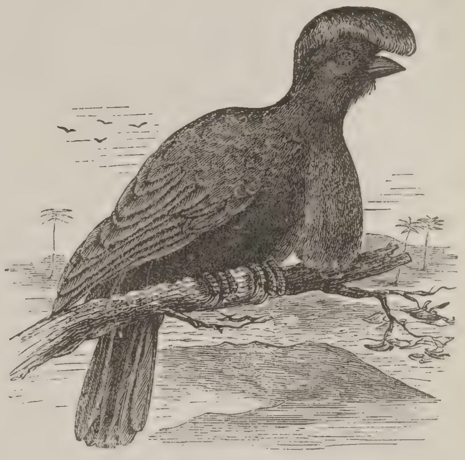
UMBRELLA (diminutive of Lat. *umbra*, a shade), a folding shade or screen, carried over the head as a protection from rain or sun. When small and used by ladies only as a sunshade, it is called a parasol (Ital. *parare*, to ward off, and *sole*, the sun). An umbrella consists of a frame covered with silk, cotton, alpaca, or other material, which can be expanded at pleasure or brought down snugly around a central stick. This stick is furnished at the lower end with a handle, and near the upper end is a metallic ring (the top notch), around which are hinged the upper ends of the ribs to which the cover is attached. Near the middle of each rib is hinged a metallic rod or stretcher, of which the lower ends all meet in a ring (the runner), sliding from the handle up far enough to spread out the ribs to the required extent. The number of ribs is usually 8, although 6, 7, 9, 10, 12, and 16 have been employed, and in the Chinese and Japanese umbrellas they amount to 40 or 50. Rattan is largely used for the ribs of the cheapest umbrellas, but its employment is steadily diminishing. Whalebone, which at one time was the principal material for the ribs, has been almost entirely superseded by steel, which, combining strength with lightness, has rapidly grown in favor since its introduction about 1840. Modern improvements have generally been in the reduction of the weight and the greater perfection of the mechanism. The most important step in this direction was the invention of the paragon ribs, patented in England in 1852 by Samuel Fox. These are of sheet steel rolled in a semi-elliptical shape, making the least weight of material with the greatest strength. The weight of the other metallic parts of the umbrella has also been much reduced within 30 years. The sticks for common umbrellas are generally made from planks sawed into strips, then turned, and bent or curved; maple is largely used for this purpose. The better class of sticks are root-ended, such as bamboo, partridge or hair wood, pimento, dogwood, myrtle, and orange. Metal tubes have been used quite largely at times. Handles are made of wood, ivory, bone, horn, tortoise shell, and a great variety of other materials. The covering of the umbrella of 50 years ago was oiled silk or glazed cotton cloth, which was very cumbrous and inconvenient; now silk, cotton, and alpaca or similar worsted fabrics are the principal materials. Cotton fabrics are sometimes, after dyeing, treated to render them less pervious to water, and to fasten the color. The Chinese and Japanese umbrellas are made entirely of bamboo, paper, and twine. Sliding caps to fit over the ends of the ribs, and hold the umbrella closed, have lately come into general use. Folding umbrellas are among the early inventions of which there are recorded patents, but they have never attained to general favor, being complicated and troublesome. Among other forms are umbrellas enclosed in walking sticks, self-opening, with sticks on which the cover can be thrown to one side, with windows in the covering, and with every variety of form and attachment. The English patent records show nearly 300 patents from 1780 to 1866 for improvements or changes in umbrellas. From 1808 to 1848, 124 patents were granted in France; and in 1873, 25 patents were taken out in the United States, bearing upon the same subject. Yet very few changes of any value are produced.—The umbrella is found sculptured on the ruins of Nineveh and on the monuments of Egypt. In China and India its use is very ancient. It had also apparently some religious signification. In the fifth incarnation of Vishnu, the god is spoken of as going down to the infernal regions bearing an umbrella in his hand. In the Scirophoria, the feast of Athena Sciras, a white parasol was borne by the priestesses from the Acropolis to the Phalerus; and the umbrella was also used in the feasts of Bacchus. The ancient Greeks and Romans had umbrellas, which from the paintings on vases appear to have been very much like those of the present time; they were used only by women. In many countries the umbrella seems to have been part of the insignia of royalty, and its use permitted only to the king and great nobles. This still continues in some parts of Asia and Africa, and in many cases it is made very large and much ornamented. The umbrellas of the Siamese kings are said to be made with several separate circles one above another, while the nobles use them with only a single circle. During the middle ages there are occasional references to umbrellas. In the basilican churches of Rome was suspended a large umbrella, and the cardinal who took his title from the church had the privilege of having an umbrella carried over his head in solemn processions. In Wright's "Domestic Manners of the English" (1862) a drawing is given from the Harleian MS. No. 603, representing an Anglo-Saxon gentleman walking out, attended by his servant carrying an umbrella with a handle that slopes backward, so as to bring the umbrella over the head of the person in front. Until a comparatively recent time umbrellas were used in Italy and France only as a protection from the sun. Kersey's "English Dictionary" (1708) defines an umbrella as a "screen commonly used by women to keep off rain." Jonas Hanway is said to have been the first man who commonly carried an umbrella in the streets of London, about 1750; at that time their use was considered a mark of great effeminacy. They were at first kept in the halls of great houses, and at coffee houses, to be used in passing from the door to the carriage. In 1787 an English advertisement speaks of "a great assortment of much approved pocket and portable umbrellas."—For a considerable time after the introduction of umbrellas into the United States, in the latter half of the 18th century, it was considered effeminate to carry one. Their manufacture was begun about 1800, and has risen to be an important branch of industry, the products equalling the best English and French. It is confined almost entirely to the cities of Philadelphia, New York, and Boston. By the census of 1870, the number of hands employed directly in the making of umbrellas and canes was 2,618, and the value of the production $4,098,032; and since that time the business has maintained a steady growth.—The silk for covering umbrellas is a special branch of weaving, principally carried on about Lyons, France; but the neighborhood of Crefeld on the Rhine also produces a large quantity, and in Switzerland and England a limited quantity is made. Some silks and alpacas for umbrellas have been made in the United States, but not with much success. The manufacture of the metal parts and of the handles is generally a separate branch. The census of 1870 gives 578 hands employed upon metallic umbrella furniture, producing a value of $724,034.

UMBRELLA (Lam.), a genus of gasteropod mollusks, so called from the resemblance of the flattened shell to an umbrella. The animal has a very large tuberculated foot, deeply notched in front; the shell is small and limpet-like, merely covering the most important organs. The *U. umbellata* (Lam.), the Chinese umbrella shell, is a native of the Indian ocean.



Umbrella umbellata.

UMBRELLA BIRD, the popular name of a singular South American bird, placed by the latest authors among the chatterers (*ampelidæ*), subfamily *gymnoderinæ* or fruit birds, and genus *cephalopterus* (Geoffr.). The bill is stout, long, flattened, gradually curved, with the tip notched and slightly hooked; wings moderate, rather pointed, with the third quill longest; tail short and rounded; toes long and slender, with curved claws. The *C. ornatus* (Geoffr.) is about as large as a crow, glossy black, with violet, blue, and metallic reflections on the crest and pectoral appendage. The head of the male is surmounted by a large crest of 50 to 80 feathers springing from over the nostrils, the lower half a white stiff shaft, and terminating each in a tuft of black hair-like feathers spreading in all directions, but principally forward; it arises from a contractile skin on the top of the head, and when erected almost hides the bill from view; it is 5 in. in length and about 4½ in. wide, somewhat resembling a beautiful blue umbrella. The skin of the neck is very loose, and from it grows a cylindrical fleshy process, about as thick as a goose quill, 1½ in. long, from which extends a tuft of imbricated feathers, bordered with metallic blue, and hanging down several inches. It is found in the islands of the great South American rivers, feeding principally on fruits; it is arboreal, and utters a very loud and deep note, which has gained for it from the tribes of the Rio Negro the name of piper bird.—The araponga or bell bird (*procnias alba*, Thunb.) is about 12 in. long and pure white; it has a singular cylindrical fleshy appendage, with a few small feathers, rising from the base of the bill; the mouth is very wide; the voice resembles the tolling of a bell, and may be heard, according to Wa-



Umbrella Bird (Cephalopterus ornatus).

terton, nearly three miles, and during the heat of the day, when most other birds are silent; it is a native of the forests of tropical South America.

UMBRIA, a country of ancient Italy, bounded N. by Cisalpine Gaul, E. and S. by the Adriatic, Picenum, and the territory of the Sabines, and W. by the Tiber, separating it from Etruria. Its principal cities were Ariminum (now Rimini), Pisaurum (Pesaro), Fanum Fortunæ (Fano), Sena Gallica (Sinigaglia), Narnia (Narni), Iguvium (Gubbio), Fulginium (Foligno), and Spoletium (Spoleto). The N. E. part stretched out toward the coast in fertile plains. Besides the Tiber, the principal rivers were the Rubicon, Ariminus (Marecchia), Pisaurus (Foglia), Metaurus (Metauro), and Æsis (Esino), all flowing into the Adriatic, and the Nar (Nera), an affluent of the Tiber. The inhabitants, the Umbri, were one of the most ancient races of the peninsula, and at an early period became the most powerful people of central Italy. Etruria was originally in their possession. The Romans overcame them in 308 B. C. The battle of Sentinum, 295 B. C., when the Samnites, Gauls, Etruscans, and Umbrians were defeated by the Romans under Quintus Fabius, is sometimes called the battle of Umbria.—The name Umbria has been revived in modern times to designate a portion of what was formerly the Papal States, comprised chiefly in the delegations of Spoleto and Perugia. It constitutes now a province of the kingdom of Italy, also called Perugia. (See PERUGIA.)

UMPQUA, a river of Oregon, which, rising in the Cascade mountains and pursuing a general W. N. W. course, breaks through the Coast range and flows into the Pacific ocean at Umpqua head, lat. 43° 41′ N. It has a total length of about 200 m., and is navigable by steamers of light draught to Roseburg, about 90 m. from its mouth, though more than half this distance is obstructed by rapids.

UMRITSIR. See AMRITSIR.

UNAU. See SLOTH.

UNCAS, a North American Indian, sachem of the Mohegan tribe in Connecticut, died about 1682, at a great age. He was originally a war chief of the Pequot nation, but about 1635 revolted from the Pequot sachem Sassacus, and gathered a band of Indians who were known by the old title of Mohegans once borne by the Pequots. In May, 1637, he joined the English in the war against the Pequots, and proved a valuable auxiliary, receiving for his services another portion of the Pequot lands. Many of the Pequots were shielded by him from the vengeance of the English when the war was over, and for this he was for a time in partial disgrace with the authorities; but he was soon received again into so great favor with the whites that several attempts were made by different Indians to assassinate him. Uncas accordingly attacked and reduced Sequasson, sachem of the Connecticut river, and in 1643 defeated and took the powerful Narragansett sachem Miantonomoh, whom he finally put to death. He was a brave but tyrannical chief, and frequent complaints were made to the colonial government of his oppression. In 1648 the Mohawks, Pocomtocks, and other tribes made war against Uncas with but little success. He was besieged in 1657 in his stronghold on the Connecticut by the Narragansett chief Pessacus, and nearly starved out; but he was relieved at almost the last moment by Ensign Leffingwell, who took in to him at night a canoe laden with supplies. For this act, it is said, Uncas gave to Leffingwell a deed for all the land upon which the town of Norwich now stands, though that chief afterward sold it to a company. He was characterized in 1674 as "an old and wicked, wilful man, a drunkard, and otherwise very vicious; who hath always been an opposer and underminer of praying to God." He was the ally of the English in all their wars against the Indians.

UNG, a N. E. county of Hungary, in the Cis-Tibiscan circle, bordering on Galicia and the counties of Zemplén, Szabolcs, and Bereg; area, 1,180 sq. m.; pop. in 1870, 130,032, the majority Slavs, and the rest Magyars. The N. part of the county is traversed by thickly wooded branches of the Carpathians, and it is watered by the Ung and the Latorcza. The chief products are rye, oats, wine, and hemp. It contains the mineral springs of Szobráncz. The capital, Ungvár, is situated on the Ung, 85 m. N. N. E. of Debreczin; pop. in 1870, 11,017. It is the seat of a United Greek bishop, and has an episcopal seminary and lyceum, a gymnasium, an ancient castle, and mineral springs.

UNGER, Franz, a German palæontologist, born in Styria in 1800, died in Gratz, Feb. 13, 1870. He took his medical degree in Vienna in 1827, and practised as a physician till 1836, when he became professor of botany at Gratz, whence he removed in 1850 to the university of Vienna. His most noteworthy publications are *Anatomie und Physiologie der Pflanzen* (1855); *Botanische Streifzüge auf dem Gebiete der Culturgeschichte* (1857 *et seq.*); *Geologie der europäischen Waldbäume* (1869 *et seq.*); and *Ueber Lieschkolben der Vorwelt* (1870). His life has been written by Reyer (Gratz, 1871).

UNGUICULATA, and **Ungulata,** terms originally applied by Ray to mammals, according as they possessed claws or hoofs, though Aristotle had made a similar division of quadrupeds, placing among unguiculates the monkeys, bats, carnivora, and rodents, and among the ungulates the pachyderms, ruminants, and solipeds (horse). Ray placed among unguiculates the camel, elephant, and edentates, as well as those above mentioned; Linnæus followed Ray in his division of quadrupeds. This system has been variously modified by Cuvier, Swainson, Oken, C. L. Bonaparte, and Owen, the last restricting the unguiculates to the monkeys and carnivora, and the ungulates to the omnivora, ruminants, solipeds, and pachyderms. The ungulates are divided by Huxley into the two sections of perissodactyls or odd-toed, and artiodactyls or even-toed; the former including the rhinoceros, tapir, and horse, the latter the omnivorous pig and hippopotamus, and the ruminating animals. (See MAMMALIA, vol. xi., pp. 79, 80, and 82.)

UNICOI, an E. county of Tennessee, separated from North Carolina by the Unaka mountains, and watered by the Nolichucky river and its tributaries; area, about 300 sq. m.; pop. about 2,000. It was formed in 1875 from Carter and Washington counties. It is a rugged mountain region, some peaks attaining a height of 5,500 ft. The arable land is confined to a few valleys and river basins. The slopes are well wooded with pine, chestnut, hemlock, cherry, spruce, and poplar. The tops of some of the peaks are bald, and furnish good pasturage. Iron ore is abundant. The climate is severe in winter, but cool and bracing in summer. Wheat, corn, oats, buckwheat, rye, and potatoes are the chief crops. Apples flourish, and peaches grow well in the recesses of the mountains. Capital, Longmire.

UNICORN, a fabulous animal resembling a horse, with a single horn issuing from the middle of the forehead, well known as the supporter with the lion of the coat of arms of England. The unicorn of various versions of the Bible undoubtedly originated in a mistranslation of a Hebrew word which probably denoted a kind of wild ox with two horns. Though the animal above described is often mentioned by ancient writers, none of them had ever seen one, and modern naturalists generally disbelieve that any such ever existed. The rhinoceros with a single horn does not correspond in any other particular to the description. The sea unicorn is the narwhal.

UNICORN PLANT. See MARTYNIA.

UNION, the name of 16 counties in the United States. **I.** A N. E. county of New Jersey, bounded N. W. by Passaic river, E. by Staten Island sound and Newark bay, and S. partly by Rahway river, and drained by Elizabeth river and several small streams; area, 101 sq. m.; pop. in 1870, 41,859. The surface is nearly level, and the soil generally fertile. It is traversed by the New Jersey, the New Jersey Central, and other railroads. The chief productions in 1870 were 5,339 bushels of wheat, 4,215 of rye, 94,618 of Indian corn, 36,948 of oats, 61,544 of potatoes, and 114,763 lbs. of butter. There were 1,428 horses, 2,780 milch cows, 899 other cattle, 460 sheep, and 1,116 swine. There were 315 manufacturing establishments, with $3,570,450 capital, and an annual product valued at $5,986,512. The principal manufactories were 34 of carriages and wagons, 1 of cars, 2 of cordage and twine, 1 of cutlery and edge tools, 7 of wagon material, 5 of iron, 3 of machinery, 3 of floor oil cloth, 1 of paving materials, 5 of sash, doors, and blinds, 9 flour mills, 3 bleaching and dyeing establishments, and 1 straw goods bleachery. Capital, Elizabeth. **II.** A central county of Pennsylvania, bounded E. by the West branch of the Susquehanna river, and drained by Penn's, Buffalo, and White Deer creeks; area, about 250 sq. m.; pop. in 1870, 15,565. Spurs of the Alleghany range traverse a large part of the county; the soil along the streams is very rich. Iron ore, bituminous coal, and limestone abound. The chief productions in 1870 were 262,639 bushels of wheat, 297,513 of Indian corn, 318,154 of oats, 75,374 of potatoes, 265,936 lbs. of butter, and 19,542 tons of hay. There were 3,271 horses, 3,565 milch cows, 3,305 other cattle, 2,639 sheep, and 6,128 swine; 2 manufactories of agricultural implements, 1 of boots, 12 of carriages and wagons, 2 of pig iron, 2 of iron castings, 8 tanneries, 1 planing mill, 4 saw mills, and 1 woollen mill. Capital, Lewisburg. **III.** A S. county of North Carolina, bordering W. and S. on South Carolina, drained by Lynches creek and branches of the Catawba and Yadkin rivers; area, about 350 sq. m.; pop. in 1870, 12,217, of whom 2,694 were colored. The surface is generally hilly, and the soil in some parts fertile. Granite and slate abound, and excellent stone for hones and whetstones is found. Gold mines of some value have been worked. The chief productions in 1870 were 79,934 bushels of wheat, 203,032 of Indian corn, 72,308 of oats, 16,945 of sweet potatoes, 75,096 lbs. of butter, 8,262 of tobacco, 12,444 of wool, and 1,196 bales of cotton. There were 1,624 horses, 3,501 milch cows, 4,735 other cattle, 8,973 sheep, and 12,163 swine. Capital, Monroe. **IV.** A N. county of South Carolina, bounded E. by Broad river and S. by the Ennoree, and intersected by the Pacolet and Tyger rivers; area, 500 sq. m.; pop. in 1875, 21,965, of whom 12,505 were colored. The surface is hilly, and the soil fertile. Iron ore and granite abound, and gold was formerly mined. It is intersected by the Spartanburg and Union railroad. The chief productions in 1870 were 36,286 bushels of wheat, 314,981 of Indian corn, 18,491 of oats, 30,610 of sweet potatoes, 92,094 lbs. of butter, 6,562 of wool, 5,282 of tobacco, and 8,537 bales of cotton. There were 1,674 horses, 1,839 mules and asses, 3,446 milch cows, 4,935 other cattle, 4,550 sheep, and 12,666 swine; 15 flour mills, and 2 iron works. Capital, Unionville. **V.** A N. county of Georgia, bordering on North Carolina, and drained by the head streams of the Hiawassee and Tocoa rivers; area, about 400 sq. m.; pop. in 1870, 5,267, of whom 114 were colored. It is traversed by the Blue Ridge. The highlands are well adapted to pasturage. Iron, marble, and granite are found, and there were formerly profitable gold mines. The chief productions in 1870 were 7,681 bushels of wheat, 10,632 of rye, 139,127 of Indian corn, 12,099 of oats, 90,098 of sweet potatoes, 50,155 lbs. of butter, 12,458 of wool, 20,268 of tobacco, and 225 tons of hay. There were 800 horses, 1,622 milch cows, 3,008 other cattle, 6,345 sheep, and 9,723 swine. Capital, Blairsville. **VI.** A N. county of Mississippi, drained by the head waters of the Tallahatchie river; area, about 400 sq. m. It has been formed since the census of 1870. The surface is generally level and the soil productive. Cotton, grain, sweet potatoes, &c., are grown. Capital, New Albany. **VII.** A N. parish of Louisiana, bordering on Arkansas, bounded E. by the Washita river, and intersected by Bayou D'Arbonne and other affluents of that stream; area, about 1,000 sq. m.; pop. in 1875, 12,158, of whom 4,667 were colored. The surface is moderately hilly, and the soil sandy and fertile. The Washita and D'Arbonne are navigable for steamboats. The chief productions in 1870 were 230,282 bushels of Indian corn, 50,445 of sweet potatoes, 28,800 lbs. of butter, and 6,675 bales of cotton. There were 1,400 horses, 1,138 mules and asses, 2,741 milch cows, 6,246 other cattle, 5,502 sheep, and 20,175 swine. Capital, Farmersville. **VIII.** A S. county of Arkansas, bordering on Louisiana, bounded N. E. by the Washita river, and drained by several of its tributaries; area, about 1,230 sq. m.; pop. in 1870, 10,571, of whom 4,896 were colored. The surface is hilly, and the soil fertile. The chief productions in 1870 were 232,038 bushels of Indian corn, 9,308 of peas and beans, 56,623 of sweet potatoes, 44,471 lbs. of butter, and 6,181 bales of cotton. There were 1,290 horses, 1,007 mules and asses, 3,071 milch cows, 4,973 other cattle, 4,697 sheep, and 14,810 swine. Capital, El Dorado. **IX.** A N. E. county of Tennessee, intersected by Clinch river, and bounded N. by Powell's river; area, about 400 sq. m.; pop. in 1870, 7,605, of whom 214 were colored. The surface in the north and centre is mountainous, and in other parts hilly, and the soil adapted to grazing. Iron and lead are found. The chief productions in 1870 were 29,615 bushels of wheat, 168,579 of Indian corn, 69,799 of oats, 53,470 lbs. of butter, 10,673 of wool, and 14,169 of tobacco. There were 1,451 horses, 1,264 milch cows, 1,987 other cattle, 6,326 sheep, and 6,971 swine. Capital, Maynardville. **X.** A N. W. county of Kentucky, separated from Indiana and Illinois by the Ohio river, and drained by Tradewater and Highland creeks; area, 350 sq. m.; pop. in 1870, 13,640, of whom 2,574 were colored. The surface is undulating or hilly, and the soil fertile. Bituminous coal is abundant, and there are several sulphur and chalybeate springs. The chief productions in 1870 were 82,892 bushels of wheat, 771,186 of Indian corn, 34,398 of oats, 69,731 lbs. of butter, 19,402 of wool, and 2,096,260 of tobacco. There were 2,800 horses, 2,130 milch cows, 4,958 other cattle, 7,816 sheep, and 14,976 swine; 3 flour mills, and 1 woollen mill. Capital, Morganfield. **XI.** A central county of Ohio, drained by affluents of Scioto river; area, 445 sq. m.; pop. in 1870, 18,730. The surface is level and the soil fertile. It is intersected by the Cleveland, Columbus, Cincinnati, and Indianapolis, and the Atlantic and Great Western railroads. The chief productions in 1870 were 208,660 bushels of wheat, 808,275 of Indian corn, 156,436 of oats, 60,341 of potatoes, 451,407 lbs. of butter, 43,654 of cheese, 390,281 of wool, and 30,027 tons of hay. There were 6,876 horses, 5,073 milch cows, 9,106 other cattle, 75,924 sheep, and 19,252 swine; 11 manufactories of carriages and wagons, 5 flour mills, 1 woollen mill, 1 distillery, 2 planing mills, and 14 saw mills. Capital, Marysville. **XII.** A S. E. county of Indiana, bordering on Ohio, drained by the East fork of Whitewater river; area, 168 sq. m.; pop. in 1870, 6,341. The surface is generally undulating and the soil very fertile. The Cincinnati and Indianapolis Junction railroad traverses it. The chief productions in 1870 were 261,895 bushels of wheat, 417,555 of Indian corn, 59,400 of oats, 16,527 of potatoes, 160,540 lbs. of butter, 13,514 of wool, and 2,699 tons of hay. There were 2,469 horses, 1,884 milch cows, 3,378 other cattle, 4,215 sheep, and 16,955 swine; 1 manufactory of agricultural implements, 4 of carriages and wagons, 2 planing mills, 3 saw mills, 1 woollen mill, and 9 flour mills. Capital, Liberty. **XIII.** A S. county of Illinois, bounded W. by the Mississippi; area, 320 sq. m.; pop. in 1870, 16,518. The surface is undulating and the soil fertile. Iron ore, lead, chalk, bituminous coal, porcelain clay, alum, and copperas are found. It is intersected by the Illinois Central railroad. The chief productions in 1870 were 180,231 bushels of wheat, 679,753 of Indian corn, 124,473 of oats, 95,352 of Irish and 75,052 of sweet potatoes, 93,545 lbs. of butter, 24,653 of wool, and 22,291 of tobacco. There were 3,919 horses, 2,907 milch cows, 5,127 other cattle, 9,342 sheep, and 25,145 swine; 5 manufactories of agricultural implements, 9 of carriages and wagons, 1 of lime, 1 of stone and earthen ware, and 12 flour mills. Capital, Jonesborough. **XIV.** A S. W. county of Iowa, drained by the head waters of the Platte and Grand rivers; area, 432 sq. m.; pop. in 1870, 5,986. The surface is level or undulating, and the soil fertile. The Burlington and Missouri River railroad passes through it. The chief productions in 1870 were 58,217 bushels of wheat, 259,063 of Indian corn, 65,145 of oats, 27,707 of potatoes, 92,797 lbs. of butter, 19,622 of wool, and 9,817 tons of hay. There were 2,058 horses, 1,557 milch cows, 3,119 other cattle, 4,675 sheep, and 5,231 swine. Capital, Afton. **XV.** The N. E. county of Oregon, bounded N. by Washington territory and E. by Idaho, separated from the latter by Snake river, and watered by Grand Ronde and Powder rivers; area, 4,550 sq. m.; pop. in 1870, 2,552, of whom 45 were Chinese. The Blue mountains are on the W. border, and the surface is generally elevated, three fourths of it consisting of mountains and hills, the former covered with forests of pine, larch, and fir, and the latter with pasturage. The valley of the Grand Ronde is large and very productive. Gold, silver, and copper are found, and some mines are in operation. The chief productions in 1870 were 61,335 bushels of wheat, 69,660 of oats, 29,666 of barley, 26,877 of potatoes, 8,154 lbs. of wool, 84,020 of butter, and 6,752 tons of hay. There were 2,204 horses, 3,585 milch cows, 4,328 other cattle, 2,791 sheep, and 5,270 swine; 5 flour mills, and 4 saw mills. Capital, La Grande. **XVI.** The S. E. county of Dakota, bordering on Iowa and Nebraska, and lying between the Big Sioux and Missouri rivers; area, about 380 sq. m.; pop. in 1870, 3,509. The Dakota Southern railroad passes through the S. part. The river bottoms are very fertile. The chief productions in 1870 were 89,618 bushels of wheat, 78,550 of Indian corn, 55,170 of oats, 9,019 of potatoes, and 100,010 lbs. of butter. There were 1,005 horses, 4,238 cattle, 350 sheep, and 933 swine; 1 flour mill, and 4 saw mills. Capital, Elk Point.

UNION CHRISTIAN COLLEGE, a seat of learning at Merom, Sullivan co., Indiana, midway between Terre Haute and Vincennes, on the Wabash river. It was incorporated in 1859, and its buildings, erected at an expense of $50,000, are on a bluff about 200 ft. high. The college edifice is of brick, 109 ft. long, 65 ft. broad, 83 ft. to floor of cupola, and 128 ft. to top of central spire. It is four stories high, and comprises 26 commodious apartments. Both sexes are admitted as students. There are five departments: academic, business, musical, scientific, and classical. There are seven instructors and 170 students. The endowment is $100,000. Disabled soldiers receive instruction free. The presidents of the college have been the Rev. N. Summerbell, D. D., the Rev. Thomas Holmes, D. D., and the Rev. T. Corwin Smith, A. M. The institution is under the control of the Christian connection.

UNION UNIVERSITY, an institution of learning in the state of New York, comprising Union college with its preparatory classical institute and school of civil engineering in Schenectady, and the medical college, the law school, and the Dudley observatory in Albany. Union college was incorporated by the regents of the university of the state of New York in 1795. It was the second college incorporated in the state, and the first north of the city of New York and west of the Hudson river. It received its name from the circumstance that several religious denominations coöperated in its organization. The first president was the Rev. John Blair Smith of Philadelphia, who resigned in 1799, and was succeeded by Jonathan Edwards the younger. The latter died in 1801, and the Rev. Jonathan Maxcy, then president of Brown university, was chosen president in 1802. He was succeeded in 1804 by the Rev. Eliphalet Nott, who held the office more than 61 years, till his death in 1866. The Rev. Laurens P. Hickok, who had long acted as vice president, was elected his successor, but resigned in 1868. The Rev. Charles A. Aiken succeeded Dr. Hickok in 1869, and resigned in 1871, when the Rev. Eliphalet Nott Potter, grandson of Dr. Nott, was elected to the office, which he still holds (1876). The college lands comprise more than 200 acres, a large part of which, being admirably adapted to ornamental purposes, is reserved for a college park, while the remainder has been put under cultivation for a school of agriculture. The college buildings comprise, besides the memorial hall, a gymnasium, chapel, and library. Besides a preparatory department, the college has a classical, a scientific, and an eclectic course, and provides special instruction in the oriental languages. There is also a special school of civil engineering, founded in 1845. In 1875–'6 there were 18 instructors and 175 students in the college, and 4 instructors and 35 students in the school of civil engineering. The college has a library of 18,000 volumes, and valuable philosophical apparatus and collections in natural history. Numerous scholarships have been founded for the benefit of indigent students. Since 1871 the college has received gifts amounting to more than $250,000. Union college acquired by its charter full university powers, but the creation of post-graduate institutions in Schenectady was not found practicable. In 1873 the institutions above named were united under the charter and board of trustees of Union college, but each retains its respective rights, powers, and corporate existence. The general management of the university is vested in a board of governors consisting of the permanent trustees of Union college and representatives from each of the post-graduate departments. The medical college was established in 1838, and in 1876 had 16 instructors and 123 students. The museum of the college is one of the most valuable institutions of the kind in the country. Many of the professors are connected with the Albany hospital, to the cliniques, lectures, and practice of which the students of the college are admitted without charge. The law school was organized in 1851, and in 1876 had 6 instructors and 93 students. The Dudley observatory was incorporated in 1852 and inaugurated in 1856. It was named in honor of Charles E. Dudley, from whose widow the institution has received gifts and a bequest amounting to more than $105,000. Over $100,000 has been expended on the buildings, instruments, grounds, &c., and $70,000 invested as a permanent fund for the support of the institution. There is a meteorological department connected with it.

UNITARIANISM, in Christian theology, the general name for the class of opinions rejecting the doctrine of the Trinity, and asserting the absolute unity of God. The term as defining a belief denies the deity of Christ and his equality with God the Father, but does not reject his divinity, or any exalted rank consistent with his subordination to God. The denial of the deity of Christ naturally led to the rejection of the doctrine of total depravity and moral inability, and of the necessity of a vicarious atonement. But this rejection is more or less absolute according to the views of individuals, some Unitarians accepting the doctrine of the fall, but denying that its consequences destroy the innate rectitude of human nature; and in respect of the atonement Unitarian belief ranges from a modified conception of the redeeming office of a Saviour to the opinion that his mission was solely that of a teacher and exemplar. Beyond these beliefs Unitarianism does not formulate a special creed, but leaves the largest latitude to individual opinion. Some Unitarians regard the gospel as designed by the Deity for the redemption of a fallen race; others as a recognition of natural religion, with precepts, truths, laws, motives, and hopes, exalting individual responsibility in character and life. Baptism and the Lord's supper are generally recognized rites, and in some congregations such festivals as Easter and Christmas are commemorated. Unitarians affirm that their belief is simply a return to the primitive Christian doctrine; that the teaching of Christ and his apostles as conveyed in the New Testament strictly conformed to the Hebrew tenet of the absolute unity of God; that for more than a century the early Christians were taught and believed this tenet; that this belief was first impaired by the speculations of the Alexandrian and Platonic schools on the mode of the divine existence and manifestations; and that the Trinitarian dogma obtained acceptance through the coöperating influences of ecclesiastical authority and imperial dictation. It is also asserted, as a matter of history, that an earnest opposition to the doctrine of the Trinity in its initiatory and developed formularies opened the most bitter controversy in the early church; and that through the successive centuries there has been an unbroken line of individual and associated believers, who as Unitarians, however differing in other points of controversy, have stood together in their opposition to Trinitarianism.—Discussions on the deity of Christ were simultaneous with the earliest speculations on the Logos. Toward the close of the 2d century Theodotus and Artemon founded schools in Rome, and nearly contemporary were Beryllus and Praxeas, who taught in the same city, and Noëtus in Smyrna. In the 3d century Sabellius announced his doctrine. Arianism originated in the 4th century, and was the parent of Socinianism, which was the progenitor of the later Unitarianism. All these teachers held to the belief in the indivisible unity. Their differing views in respect of other doctrines, and the varying shades of opinion adopted by their disciples as to the degree of elevation to be ascribed to Christ as an inspired teacher, an infallible guide, an impeccable being, and a perfect human example, are shown in the articles Arianism, Arius, Noëtians, Sabellius, and Socinus. For a long time before the reformation there was in Italy much dissent from the Trinitarian tenet. The reformation developed the extent of this dissent, and its adherents were driven from the country. At the same time Ludwig Hetzer, Johann Denk, and Sebastian Frank in Germany, and Claudius in Switzerland, preached monotheism and the simple humanity of Christ. In the 16th century Unitarianism was also widely disseminated in Holland and France. About 1549 Lælius Socinus came from Venice to Zürich. In 1553, for his disbelief in the Trinity and other opinions, Michael Servetus was burned at the stake in Geneva, and after his death the Swiss Anabaptists and those who rejected the Trinity were called Servetists. (See Servetus.) In 1563 Bernardino Ochino published in Zürich his dialogues discussing the doctrine of the Trinity. Contemporary teachers in Geneva were Matteo Gribaldi and Giorgio Blandrata. A few years later Giovanni Valentino Gentilio, a Servetist, was beheaded at Bern. In 1577 Faustus, the nephew of Lælius Socinus, who had inherited the writings of his uncle, proclaimed in Basel that the Trinity was a pagan doctrine. With many others he took refuge in Poland, and his writings were published in Raków. Several exiles settled at Pinczów, and were known as Pinczovians. After years of prosperity in Poland, the Lublin church was broken up in 1627, the Raków school was destroyed in 1638, and later the decree making death the penalty for professing Arianism drove many into the abandonment of their belief; others went to Transylvania, Prussia, Silesia, and the Netherlands; and at the end of the century Unitarians in Europe, as a body, were known only in Transylvania.—In England there are traces of Unitarianism coeval with the reformation. In the time of Edward VI., George Van Paris, for denying the divinity of Christ, was burned at Smithfield, as were Francis Wright at Norwich in 1588, and Bartholomew Legate in Smithfield and Edward Wightman in Lichfield in 1612. John Biddle (1615–'62), by his publications, preaching, and foundation of a sect called Biddellians, earned the title of "the father of English Unitarians." (See Biddle, John.) In 1640 the synods of London and York directed a special canon against Socinianism. In 1652 the Racovian (Raków) catechism was burned in London. According to Dr. Owen, the denial of the divinity of Christ was in 1655 common throughout England. Before the close of the 17th century Unitarians had places of worship in London. Milton's Arianism was completely established after his death. Locke indirectly favored Unitarian views. In 1705 there were "troops of Unitarian and Socinian writers." Thomas Firmin disseminated Unitarian doctrines within the establishment. Evelyn revived Arianism in Dublin, and afterward preached it in London; and Hartley's "Observations on Man" gave rise to the school of which Joseph Priestley was the head. The growth of the denomination warranted the foundation in 1825 of the British and foreign Unitarian association, which has regularly held its anniversaries in London, celebrated its semi-centennial in 1875, and is devoted to the dissemination of books and tracts, to limited missionary efforts, to philanthropic labors, and the help of feeble Unitarian societies.—From the first settlement of the New England colonies there were modifications of the Puritanic creed which assumed the phases of moderate Calvinism, Arminianism, and Arianism. In 1785 the congregation of King's chapel, Boston, eliminated Trinitarianism and the direct worship of Christ from the "Book of Common Prayer." In 1805 a Unitarian was made professor of divinity at Cambridge. In 1815 the controversy between Dr. Channing and Dr. Worcester resulted in the separation of the Unitarians from the Congregationalists, and the establishment of a sect. The ministers of a large number of the Congregational churches of Boston and vicinity and throughout the state with their flocks joined the movement. Harvard college was in their hands, and still remains so. In 1825 the American Unitarian association was organized in Boston, where it celebrated its semi-centennial in 1875. Its general purposes are similar to those of the British and foreign association. It has observed its anniversaries by public meetings, which have afforded opportunities for displaying such denominational zeal and promoting such interests as are consistent with the spirit and objects of the association. Under the name of the "National Conference of Unitarian and other Christian Churches," a considerable number of congregations and religious and benevolent societies are represented by ministers and delegates in biennial gatherings. The organization of the conference is of the most informal character, and its chief purpose is to afford opportunities for discussion, counsel, and advice on practical religious interests.—The "Unitarian Year Book" for 1876 estimates the total number of churches and societies in the United States at 362. In England the Unitarians rank with the first among the minor religious bodies, and their influence is increasing, especially in London and in the manufacturing districts. The principal churches are in London, Liverpool, Manchester, Birmingham, and Sheffield. Among the Scotch-Irish population in the north of Ireland there are more than 40 congregations, the most important being in Belfast; and there is a "North of Ireland Unitarian Society," besides the "Irish Unitarian society." There are also South Wales and Scotch Unitarian associations, but the number of congregations in Scotland is small. In London the Unitarians have an extensive Sunday school association, and the Manchester New college, removed from Manchester in 1857. The "Memorial Hall" was in 1865 erected for a separate Unitarian college in the city of Manchester, and students from the Unitarian denomination are admitted to the Presbyterian college at Carmarthen, Wales. Several of the British colonies offer a new field for Unitarianism, especially Australia, where the most influential churches are at Adelaide, Melbourne, and Sydney.—The total number of Unitarians in English-speaking communities all over the world was estimated in 1876 at 1,000,000, besides great numbers sympathizing with the humanitarian elements of Unitarianism, though nominally belonging to other denominations. The persecution of the Unitarians in Hungary and Transylvania, which took place mainly after the annexation of the latter country to Austria in 1713, ceased toward the close of the 18th century, owing to the tolerant policy of the emperor Joseph II. The Transylvanian Unitarians are the only members of that persuasion who are governed by an ecclesiastical council and a bishop. They have a great Unitarian college at Klausenburg, besides other institutions. They have over 100 small congregations with nearly 60,000 members, chiefly Szeklers, and their number is steadily increasing. A meeting of Hungarian, American, and English Unitarians, held at Buda-Pesth, June 15, 1873, in connection with the national Transylvanian convention at Klausenburg, favored the employment of a larger number of teachers in the Unitarian institutions of that city, and the establishment of a church in the capital of Hungary.

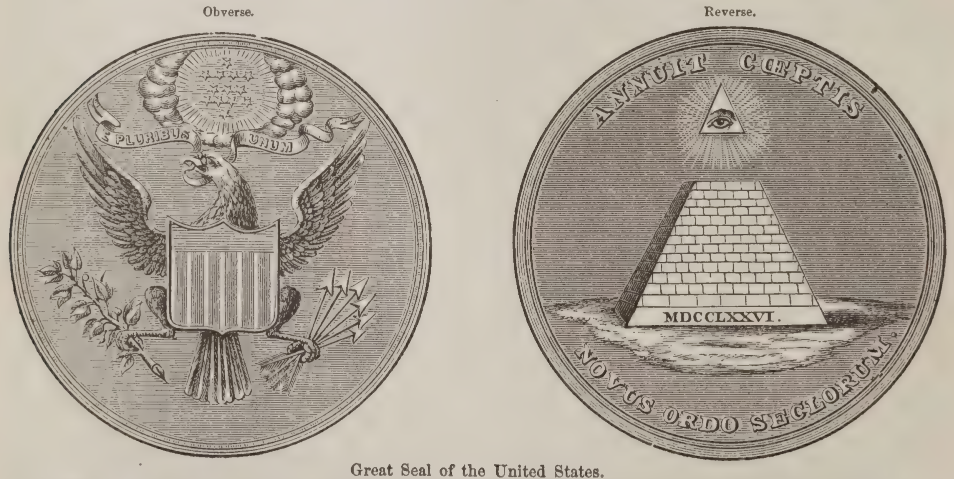
UNITAS FRATRUM. See Moravians.

UNITED BRETHREN IN CHRIST, a Protestant church, frequently confounded with the Moravians, with whom, however, they have no ecclesiastical connection. They arose among the Germans in Pennsylvania about 1760. In 1752 Philip William Otterbein, a missionary of the German Reformed church, sent out to America by the synod of Holland, began to preach in Lancaster, Pa., but, soon becoming convinced that he was not himself converted, rested not until he experienced what he regarded as the new birth. This new experience led him to institute meetings during the week for prayer and religious conference, and he also held in various places outside of his pastoral charge what were called "great meetings." To one of these, held at Isaac Long's in Lancaster co., all persons who had experienced a change of heart, without respect to their ecclesiastical relations, were especially invited. A large assembly, in which Lutherans, Reformed, Mennonites, Dunkers, Amish, and Moravians were represented, convened; and among the number was found Martin Boehm, a Mennonite preacher, who had also some time before obtained what he deemed the new life. At the conclusion of a remarkably effective sermon by Boehm, Otterbein arose, embraced him, and exclaimed, "We are brethren!" This was the origin of the name of the new church. Otterbein and Boehm labored together for more than 50 years, and as the calls for preaching became numerous, laymen selected from the converts were licensed to preach. These laborers at first held conferences at the great meetings; but when this became impracticable, annual conferences were appointed, where preachers were licensed, examined, disciplined, and directed in their labors. (See OTTERBEIN, PHILIP WILLIAM.) The first annual conference met in 1800, the first general conference in 1815. In 1875 this denomination had 43 annual conferences, 4,010 organized churches, 1,967 ministers, and 136,076 members. It has at Dayton, Ohio, an extensive printing establishment, where several periodicals and a variety of books are issued in English and German. The aggregate circulation of the periodicals published by this church, in July, 1874, was 181,500 copies. At the quadrennial meeting of the general conference in 1873, the receipts of the book concern during the preceding four years were reported at $322,370, the expenditures at $318,628, and the excess of assets over liabilities at $96,525. In 1875 the church owned ten institutions of learning, viz.: Lebanon Valley college, Annville, Pa.; Otterbein university, Westerville, O.; the Union Biblical seminary, Dayton, O.; Hartsville university, Hartsville, Ind.; Green Hill seminary, Poolsville, Ind.; Roanoke seminary, Roanoke, Ind.; Westfield college, Westfield, Ill.; Western college, Western, Iowa; Lane university, Lecompton, Kansas; and Philomath college, Philomath, Oregon. The United Brethren in Christ are Arminian in theology, and supply their churches with preaching on the itinerant plan. They have quarterly, annual, and general conferences. The highest ecclesiastical body is the general conference, which meets every four years. Until 1873 it consisted exclusively of clerical delegates; but in that year it adopted the principle of lay delegation, and the church ratified it when it was submitted to a general vote. It elects bishops (in 1873, four) for a term of four years, and assigns to each a district. No slaveholder, no adhering member of any secret combination, and no manufacturer, seller, or drinker of intoxicating liquors can be a member of the church. They regard a change of heart as indispensable to membership. Baptism is administered by either sprinkling, pouring, or immersion, each member being permitted to exercise his own judgment in regard to the mode; infants are baptized when it is desired. Open communion is practised. Until about 1825 the United Brethren in Christ confined their labors almost exclusively to persons speaking German, but most of the communicants now speak English. Being one of the most outspoken anti-slavery churches, they had before the civil war hardly any congregations in the southern states; since then they have established several there. In some of the western states this church is among the largest denominations. Foreign missions have been established in Africa and Germany. —See "History of the United Brethren in Christ," by G. Lawrence.

UNITED EVANGELICAL CHURCH, an ecclesiastical denomination in Germany, which arose in 1817 out of a union of the Lutheran and Reformed churches. Attempts at uniting these two churches were made as early as 1529, when leading theologians of both schools held a conference at Marburg. These attempts were often renewed, and other religious conferences between theologians of the two denominations were held at Leipsic in 1631, and at Cassel in 1661. In 1703 Frederick I. of Prussia convened several Lutheran and Reformed theologians at Berlin, to discuss the practicability of a union. He erected union churches at Berlin and Charlottenburg, and had the orphans of the two denominations brought up in the same establishments; but the Lutheran clergy successfully resisted the progress of these schemes. A "Plan of Union" proposed by Klemm and Pfaff, theologians of Tübingen (1710–1722), met with little favor. Frederick William I. issued several decrees designed to promote a union. The rise of rationalism, toward the close of the 18th century, disposed the theologians generally in favor of a union of the two churches, whose distinctive tenets, it was generally admitted, had but few believers among the clergy of either. Schleiermacher proposed to establish at first only an external church unity, and to leave the controversies of scientific theology open to discussion. The tercentenary of the reformation in 1817 led at length to the practical establishment of the union, which, however, in the opinion of many of its advocates, was to consist at first only in the establishment of a common church government and the common celebration of the Lord's supper. The leadership in this movement was assumed and has ever since been maintained by the government of Prussia. The clergy of Berlin issued a declaration in favor of the union, and a circular of the minister of the interior confirmed it, and decreed that the united church should bear henceforth the name Evangelical Christian church. It was thought that the union would be gradually and peaceably consummated by an agreement respecting a constitution, church property, and ordinary usages. It was also decided that the Lord's supper should be celebrated by a mere breaking of the bread and a faithful recitation of the words used in the original institution. For several years this work appeared to be in process of accomplishment in the several ecclesiastical corporations, sometimes by public enactments and sometimes as the government directed, by a practical acceptance of the breaking of the bread and an acknowledgment of the authorities of the united church; but it was considerably disturbed by the introduction of a new liturgical book, the *Agenda*. A theological commission, appointed to compose such an instrument, accomplished nothing. The king then published an *Agenda*, which had been introduced by his cabinet (1822) into the court church, gave orders that it should be introduced into the garrison churches of his kingdom, and recommended it to all the congregations of the realm, instead of the conflicting and arbitrary forms which had previously been used in the different provinces. Many objections were raised against the *Agenda*, especially by the strict Lutherans; and when in 1834 a royal decree was issued ordering its introduction into all non-united as well as united congregations of the kingdom, a number of strict Lutherans seceded from the national church. For several years the government endeavored by the suspension of ministers to coerce them back into the national church; but in 1845 Frederick William IV. conceded liberty of worship. They then organized an independent Lutheran church, which numbered in 1871 about 20,000 members. All the rest of the former Lutheran and Reformed churches of Prussia nominally connected themselves with the United Evangelical church. But there was great difference of opinion as to the nature and extent of the union by which the United Evangelical church had been called into existence. One party, generally called the confederalists, under the leadership of Prof. Hengstenberg and Dr. Stahl, maintained that the union consisted in a mere external confederation and subjection to the same general church government; that the individual churches remained Lutheran, Reformed, or (if they have expressly adopted the union) United; and that if the right of adhering to the old standards of the Lutheran confession should be curtailed, it would become the duty of the party to secede. A second party, commonly called the consensus party, took for its doctrinal basis the Bible and the common dogmas of the Lutheran and Reformed confessions. It controlled the theological faculties of most of the universities, not only in Prussia, but in the other German states. Among its leading men were Nitzsch, Twesten, Hoffmann, Niedner, Tholuck, Julius Müller, Jacobi, Dorner, Lange, Liebner, Stier, Ullmann, Umbreit, Ebrard, Herzog, and Rothe. A third party, frequently designated as the union party, rejected the authoritative character of the old symbolical books of both the Lutheran and Reformed denominations, and based themselves on the Bible simply, claiming at the same time the right of subjecting the authenticity of the Old and New Testaments to critical examination. This party embraced many of the disciples of Schleiermacher, the school of Tübingen, and liberal divines of different shades of opinion. The second and third parties agreed in asking for the introduction of a presbyterian church constitution, embracing district, provincial, and general synods; but their exertions were vigorously resisted by the confederalists. Frederick William IV., who repeatedly declared his wish to restore full self-government to the national church, convoked in 1846 a general synod, in order to complete her organization. The work was interrupted by the revolution of 1848, but resumed in 1856 by another general conference. While the government of Frederick William IV. had strongly favored the first of these three parties, his successor William I. showed an outspoken sympathy with the second. The supreme ecclesiastical council tried to check the manifestations of the Lutheran clergymen and societies who endeavored to maintain the strictly denominational character of the formerly Lutheran section of the church. The annexation to Prussia of Schleswig-Holstein and Hanover, both of which countries had a Lutheran state church that had never accepted the union, created new difficulties in the way of carrying it through. A radical change in the constitution of the church began in 1874, when the state government, in accordance with the laws passed in 1873, substituted the principle of ecclesiastical self-government for that of the consistorial administration heretofore exercised by the state. Church councils were elected in all congregations, and circuit synods, consisting of delegates of the congregations, were convoked. In January and February, 1875, provincial synods, composed of delegates of the circuit synods, met in all the eight old provinces of Prussia (those belonging to Prussia before the annexations of 1866), and in November and December an extraordinary general synod, formed of delegations of the eight provincial synods and members appointed by the king, met in Berlin to make all necessary preparations for a transfer of the government of the church to a regular general synod. The Prussian government makes the utmost exertions to render it possible for the discordant ecclesiastical parties to live peaceably side by side in the national church, but large numbers, especially of the adherents of strict Lutheran principles, may ultimately prefer secession to a continuance of their church communion with parties which they consider heretical.—The example of the king of Prussia in consolidating the Lutheran and Reformed churches into a United Evangelical church was followed in other German states. Thus the union was introduced, either by resolution of synods or by a general vote, in Nassau (1817), the Bavarian Palatinate (1818), Baden (1821), and even in Würtemberg (1827), where the Reformed church had hardly an existence. The union may be considered permanently established in the Bavarian Palatinate and in Baden, in both of which the church has a presbyterian constitution, inclusive of a general synod, which in both churches is unanimous in maintaining the union. Saxony, the bulk of Bavaria proper, Mecklenburg, Brunswick, and several other states were too exclusively Lutheran, Switzerland too exclusively Reformed, to fall in with the movement. In many of the small states the views of the people on the subject of union could not be ascertained, as the church was without a synodal constitution and entirely controlled by the government. The introduction of the synodal constitution, which in 1875 had been completed in the large majority of the Protestant state churches, United Evangelical as well as Lutheran, will ere long define the position of every church in regard to the union. In Austria and France a fusion of the Lutheran and Reformed churches has also many friends, but nothing has been done in the way of practical execution.—See Hering, *Geschichte der kirchlichen Unionsversuche* (2 vols., Leipsic, 1836–'8); Nitzsch, *Urkundenbuch der evangelischen Union* (Bonn, 1853); Julius Müller, *Die evangelische Union* (Leipsic, 1854); Stahl, *Die lutherische Kirche und die Union* (Berlin, 1858).—A branch of the United Evangelical church in the United States was established at St. Louis in 1840, when six German ministers organized an ecclesiastical body called *Evangelischer Kirchenverein des Westens* (Evangelical Church Union of the West). In 1856 this body was divided into three districts, in 1866 it changed its name into "German Evangelical Synod of the West," and in 1870 it reported at the "General Assembly," held in Louisville, 162 ministers, 300 congregations, 12,000 voting members, about 20,000 communicants, and a total population of about 50,000. Independent of this organization, another branch of the United Evangelical church was constituted in 1848 under the name of "Evangelical Synod of North America." In May, 1859, it split into two independent bodies, one of which assumed the name "United Evangelical Synod of the Northwest," and the other "United Evangelical Synod of the East." Both of them united in 1872 with the "German Evangelical Synod of the West," constituting henceforth the fourth and fifth districts of this body. In 1874 the church was redistricted by the general conference held in Indianapolis into seven particular synods; it numbered at this time about 300 ministers and 40,000 communicants. The church has a theological seminary in Warren co., Mo., and another educational institution at Elmhurst, Ill. In 1876 the German language was still exclusively used in all the congregations of this church. It publishes three denominational papers.

UNITED PROVINCES. See Netherlands.

UNITED STATES OF AMERICA, a federal republic in North America, comprising the central portion of the continent and the territory of Alaska, separated from the rest by British Columbia. (See Alaska.) The main portion lies between lat. 24° 30′ and 49° 24′ N. (at the lake of the Woods, W. of which the boundary follows the 49th parallel), and lon. 66° 50′ and 124° 45′ W. It is bounded N. by British America, from which it is in part separated by Lakes Superior, Huron, St. Clair, Erie, and Ontario, with their connecting streams, and the river St. Lawrence (see Canada, vol. iii., p. 672); E. by New Brunswick and the Atlantic ocean; S. by the gulf and republic of Mexico, from which it is partly separated by the Rio Grande; and W. by the Pacific ocean. The British American boundary, according to the war department map (1869), measures 3,540 m.; the Mexican, 1,550 m. The greatest length, from Cape Cod on the Atlantic to the Pacific near the 42d parallel, is nearly 2,800 m., and the greatest breadth, from the N. W. extremity of Minnesota to the southernmost point of Texas, 1,600 m.; general breadth, about 1,200 m. The area, according to Walker's "Statistical Atlas of the United States," is 3,026,494 sq. m. (exclusive of lakes and river surfaces bounding the republic or the single states), of which 827,844 sq. m. belonged



Obverse. Reverse.

Great Seal of the United States.

[The device for the great seal of the United States, as adopted by act of the continental congress on June 20, 1782, and re-adopted by the new congress, Sept. 15, 1789, provided for an obverse and a reverse, substantially as here depicted; but there is no evidence that the reverse was ever made. In the obverse as originally adopted, the eagle held in his sinister talon a bundle of thirteen arrows, and the first seal was thus made; but when, in 1841, a new seal was made to take the place of the old one, which had become worn, only six arrows were put into the eagle's talon. Whether this change, which was unauthorized by law, was made by design or by accident, is not known.]

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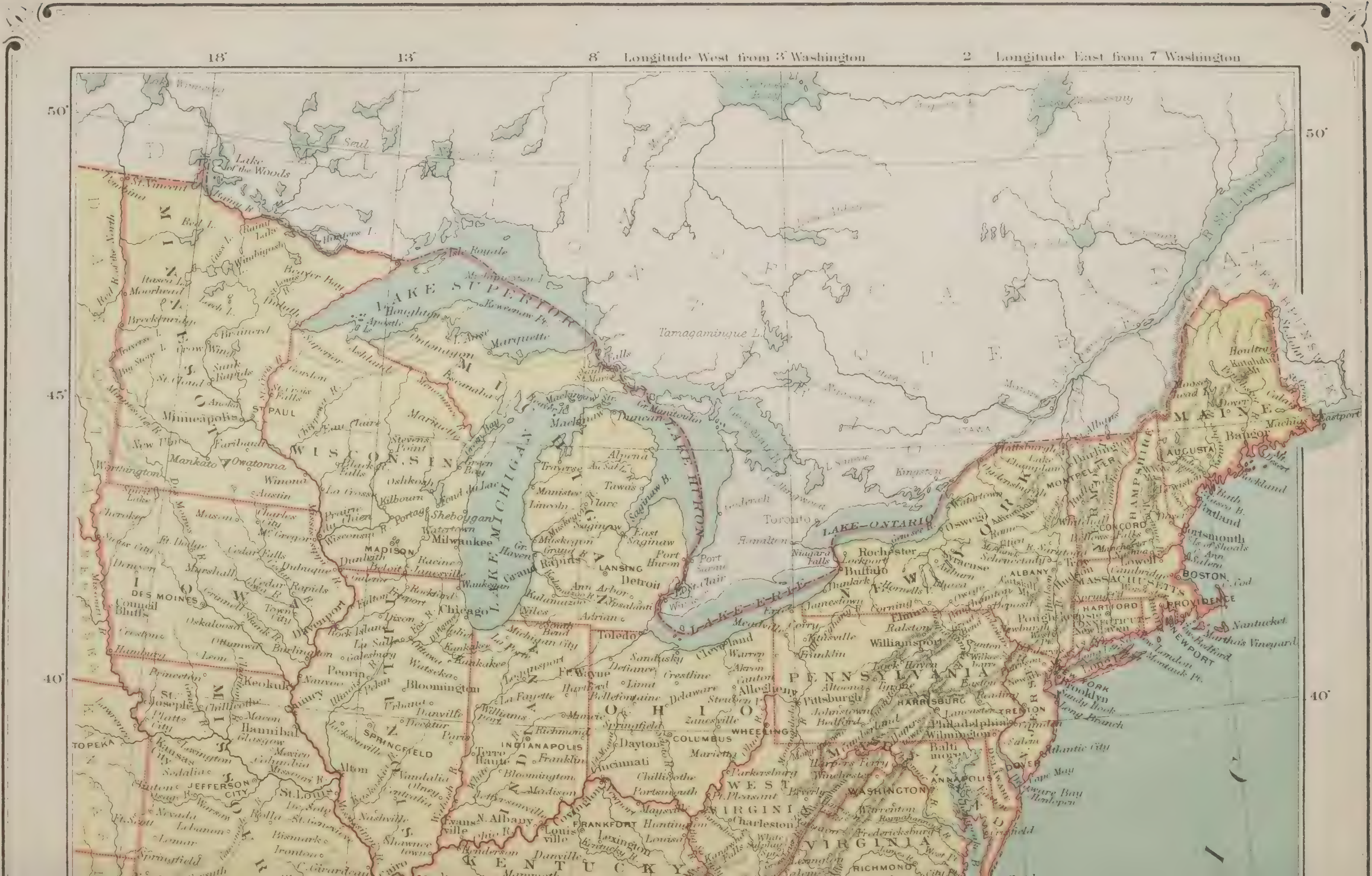
18°
13°
8° Longitude West from 3° Washington
2 Longitude East from 7 Washington
50°
45°
40°
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE-ONTARIO
L-A-K-E E-R-I-E
Lake of the Woods
Tamagamingue L.
St. Lawrence R.
Isle Royale
MAINE
NEW HAMPSHIRE
VERMONT
MASSACHUSETTS
NEW YORK
PENNSYLVANIA
OHIO
INDIANA
ILLINOIS
MICHIGAN
WISCONSIN
MINNESOTA
IOWA
MISSOURI
KENTUCKY
WEST VIRGINIA
VIRGINIA
DELAWARE
AUGUSTA
Bangor
Eastport
Portland
Portsmouth
BOSTON
PROVIDENCE
NEWPORT
Nantucket
Martha's Vineyard
HARTFORD
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Long Branch
Atlantic City
Cape May
TRENTON
Philadelphia
Wilmington
DOVER
HARRISBURG
Pittsburgh
Williamsport
Allegheny
Erie
Baltimore
ANNAPOLIS
WASHINGTON
Harpers Ferry
Winchester
Fredericksburg
RICHMOND
Charleston
Parkersburg
WHEELING
COLUMBUS
Cleveland
Toledo
Sandusky
Dayton
Cincinnati
Zanesville
Springfield
Portsmouth
Chillicothe
Detroit
LANSING
Grand Rapids
Kalamazoo
Ann Arbor
Saginaw
Port Huron
Alpena
Mackinaw
Toronto
Kingston
Hamilton
Ottawa
INDIANAPOLIS
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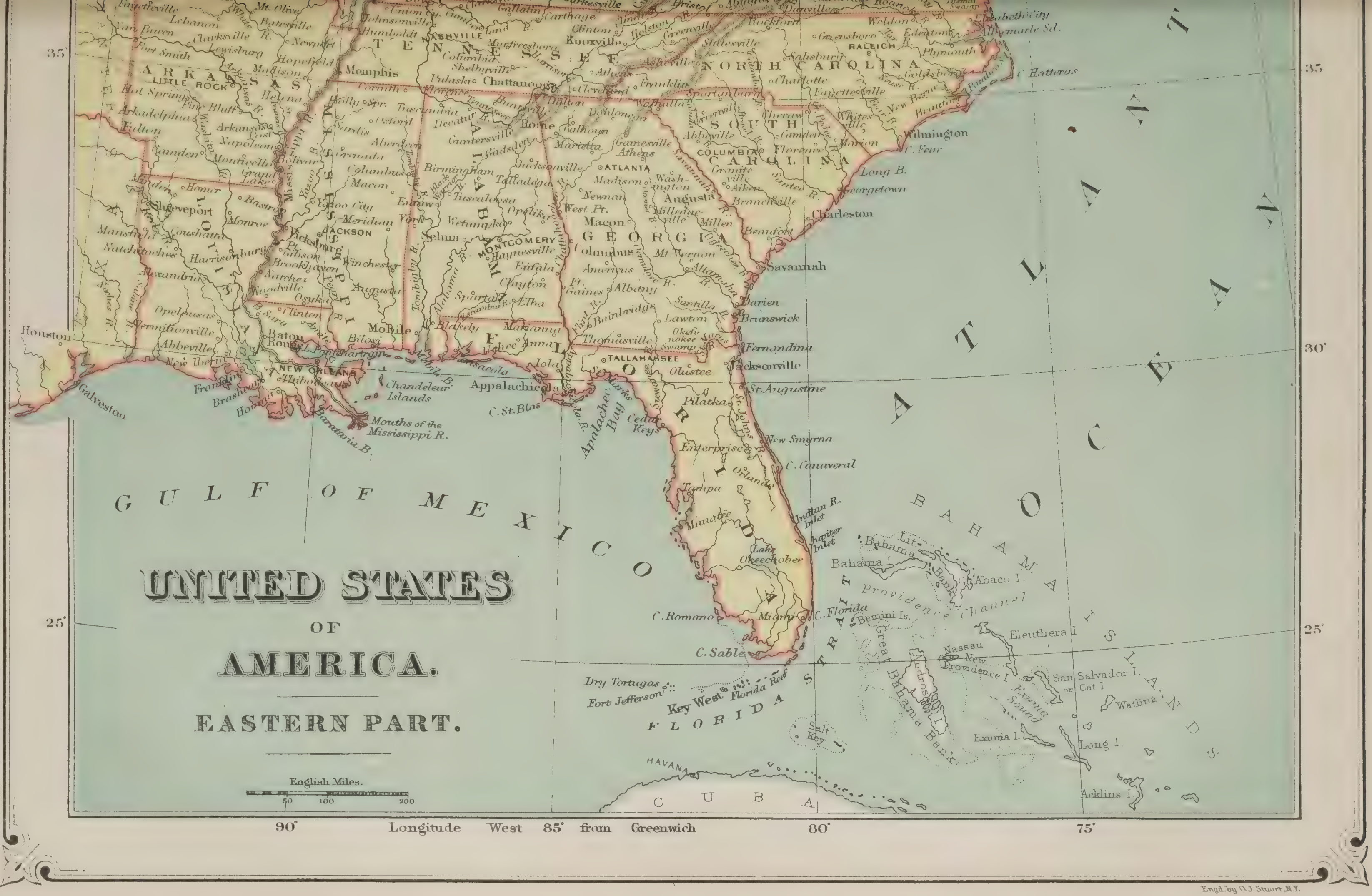
Fort Wayne
La Fayette
Evansville
New Albany
FRANKFORT
Lexington
Louisville
Chicago
SPRINGFIELD
Peoria
Bloomington
Quincy
Alton
Cairo
MADISON
Milwaukee
Sheboygan
Green Bay
La Crosse
Oshkosh
Marquette
Houghton
Duluth
ST PAUL
Minneapolis
Winona
Mankato
Owatonna
St. Cloud
DES MOINES
Council Bluffs
Dubuque
Davenport
Burlington
Keokuk
Cedar Rapids
St. Louis
JEFFERSON CITY
Hannibal
St. Joseph
Kansas City
Sedalia
Springfield
TOPEKA



UNITED STATES OF AMERICA.

EASTERN PART.

Engd. by O. J. Stuart, N.Y.

to the republic at the peace of 1783, 1,171,931 sq. m. were added by the Louisiana purchase from France in 1803 (supplemented by the Oregon treaty with Great Britain in 1846), 59,268 sq. m. by the Spanish cession of 1819, and 967,451 sq. m. from Mexico, viz.: 376,133 sq. m. by the annexation of Texas in 1845, 545,783 sq. m. by the treaty of Guadalupe Hidalgo in 1848, and 45,535 sq. m. by the Gadsden purchase in 1853.—The republic is divided into 37 states, one federal district (District of Columbia, ceded by Maryland), nine organized territories, and two unorganized territories (Alaska and Indian territory). By the act of congress of March 3, 1875, Colorado is authorized to frame a constitution and to submit it to a vote of the people in July, 1876, when, in case of its adoption, the president is to issue a proclamation declaring the territory admitted into the Union as a state. A bill for the admission of New Mexico as a state passed the senate March 10, 1876, and is (June 1) pending before the house of representatives. For convenience the states are generally classified by geographers as follows: eastern or New England states, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut; middle states, New York, New Jersey, Pennsylvania, Delaware; southern states, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Tennessee, Kentucky; western states, Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska; Pacific states, California, Oregon, Nevada. Another classification is: Atlantic and Pacific states, those on the Atlantic and Pacific slopes respectively; gulf states, those bordering on the gulf of Mexico; southwestern states, Louisiana, Texas, Arkansas, Missouri, Kansas; northwestern states, Michigan, Wisconsin, Minnesota, Iowa, Nebraska; central states, Ohio, Indiana, Illinois, Kentucky, Tennessee. The slave states, those in which slavery existed at the outbreak of the civil war, numbered 15, viz.: Delaware, Maryland, Virginia (then including West Virginia), North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, Tennessee, Kentucky, Missouri; the others were known as the free states. Of the states, 13 existed at the formation of the constitution, and 24 have been admitted under its provisions. Of these one (Texas) was an independent republic, four were formed directly from other states (Kentucky from Virginia, Maine from Massachusetts, Vermont from territories claimed by New York and previously also by New Hampshire, and West Virginia from Virginia), and the rest were created from the public domain. The following tables contain a list of the states and territories, with various particulars. The second and third columns of the first give for the original states the date and order of ratification of the federal constitution, for the other states the date and order of admission into the Union, and for the territories the date and order of organization. The areas are taken from the report of the census of 1870. Many of these, as well as the general figures given above, are based mainly on approximative computations. In a few instances slightly different figures have been given in the articles on the states and territories, those in PENNSYLVANIA being the estimate of the state geologist. The aggregate population in the second table includes tribal Indians, as estimated by the superintendent of the census in 1870.

STATES.	Date.	Order.	Area in square miles.	Relative size.	CAPITALS.
Alabama	1819	9	50,722	16	Montgomery.
Arkansas	1836	12	52,198	15	Little Rock.
California	1850	18	188,981	2	Sacramento.
* Connecticut	1788	5	4,750	35	Hartford.
* Delaware	1787	1	2,120	36	Dover.
Florida	1845	14	59,268	9	Tallahassee.
* Georgia	1788	4	58,000	10	Atlanta.
Illinois	1818	8	55,410	12	Springfield.
Indiana	1816	6	33,809	28	Indianapolis.
Iowa	1846	16	55,045	13	Des Moines.
Kansas	1861	21	81,318	6	Topeka.
Kentucky	1792	2	37,680	25	Frankfort.
Louisiana	1812	5	41,346	22	New Orleans.
Maine	1820	10	35,000	26	Augusta.
* Maryland	1788	7	11,124	30	Annapolis.
* Massachusetts	1788	6	7,800	34	Boston.
Michigan	1837	13	56,451	11	Lansing.
Minnesota	1858	19	83,531	5	St. Paul.
Mississippi	1817	7	47,156	18	Jackson.
Missouri	1821	11	65,350	8	Jefferson City.
Nebraska	1867	24	75,995	7	Lincoln.
Nevada	1864	23	104,125	3	Carson City.
* New Hampshire	1788	9	9,280	32	Concord.
* New Jersey	1787	3	8,320	33	Trenton.
* New York	1788	11	47,000	19	Albany.
* North Carolina	1789	12	50,704	17	Raleigh.
Ohio	1802	4	39,964	23	Columbus.
Oregon	1859	20	95,274	4	Salem.
* Pennsylvania	1787	2	46,000	20	Harrisburg.
* Rhode Island	1790	13	1,306	37	Newport and Providence.
* South Carolina	1788	8	34,000	27	Columbia.
Tennessee	1796	3	45,600	21	Nashville.
Texas	1845	15	274,356	1	Austin.
Vermont	1791	1	10,212	31	Montpelier.
* Virginia	1788	10	38,348	24	Richmond.
West Virginia	1863	22	23,000	29	Wheeling.
Wisconsin	1848	17	53,924	14	Madison.
Total states	....	..	1,984,467	..	
TERRITORIES.					
Arizona	1863	7	113,916	4	Tucson.
Colorado	1861	5	104,500	5	Denver.
Dakota	1861	6	148,932	1	Yankton.
Dist. of Columbia...†	1801	1	64	11	Washington.
Idaho	1863	8	86,294	7	Boisé City.
Indian Territory	....	..	68,991	10	....
Montana	1864	9	145,776	2	Helena.
New Mexico	1850	3	121,201	3	Santa Fé.
Utah	1850	2	84,476	8	Salt Lake City.
Washington	1853	4	69,994	9	Olympia.
Wyoming	1868	10	97,883	6	Cheyenne.
Total territories	....	..	1,042,027	..	
Total U. S., exclusive of Alaska	....	..	3,026,494	..	
Alaska...‡	1867	..	577,390	..	Sitka.
Total United States	....	..	3,603,884	..	Washington.

* The thirteen original states.
† Date when congress assumed exclusive jurisdiction.
‡ Date of cession by Russia.

STATES.	POPULATION AS RETURNED BY THE CENSUS OF 1870.												Aggregate population, including tribal Indians.
	White.	Rank in white population.	Colored.	Rank in colored population.	Born in the United States.	Rank in native population.	Born in foreign countries.	Rank in foreign population.	Total, including Chinese and non-tribal Indians.	Rank in total population.	Population per square mile.	Rank in density of population.	
Alabama........	521,384	21	475,510	3	987,030	14	9,962	32	996,992	16	19·66	23	996,992
Arkansas........	362,115	26	122,169	12	479,445	24	5,026	35	484,471	26	9·30	29	484,471
California........	499,424	22	4,272	29	350,416	27	209,831	9	560,247	24	2·96	34	582,031
Connecticut......	527,549	20	9,668	26	423,815	26	113,639	14	537,454	25	113·15	8	537,454
Delaware........	102,221	34	22,794	21	115,879	34	9,136	33	125,015	34	58·97	9	125,015
Florida..........	96,057	35	91,689	14	182,781	32	4,967	36	187,748	33	3·17	32	188,248
Georgia..........	638,926	16	545,142	1	1,172,982	10	11,127	31	1,184,109	12	20·42	22	1,184,109
Illinois	2,511,096	4	28,762	19	2,024,693	4	515,198	3	2,539,891	4	45·84	11	2,539,891
Indiana	1,655,837	5	24,560	20	1,539,163	5	141,474	13	1,680,637	6	49·71	10	1,680,637
Iowa.............	1,188,207	8	5,762	27	989,328	13	204,692	10	1,194,020	11	21·69	21	1,192,092
Kansas..........	346,377	28	17,108	23	316,007	28	48,392	21	364,399	29	4·48	31	373,299
Kentucky	1,098,692	10	222,210	10	1,257,613	7	63,398	16	1,321,011	8	35·33	12	1,321,011
Louisiana........	362,065	27	364,210	7	665,088	22	61,827	18	726,915	21	17·58	27	726,915
Maine............	624,809	17	1,606	31	578,034	23	48,881	20	626,915	23	17·91	26	626,915
Maryland........	605,497	18	175,391	11	697,482	20	83,412	15	780,894	20	70·20	7	780,894
Massachusetts....	1,443,156	7	13,947	24	1,104,032	11	353,319	6	1,457,351	7	186·84	1	1,457,351
Michigan	1,167,282	9	11,849	25	916,049	15	268,010	7	1,184,059	13	20·97	19	1,187,234
Minnesota........	438,257	23	759	34	279,009	31	160,697	12	439,706	28	5·26	30	446,056
Mississippi	382,896	25	444,201	4	816,731	16	11,191	30	827,922	18	17·56	28	827,922
Missouri..........	1,603,146	6	118,071	13	1,499,028	6	222,267	8	1,721,295	5	26·34	17	1,721,295
Nebraska........	122,117	33	789	33	92,245	35	30,748	23	122,993	35	1·62	35	129,322
Nevada..........	38,959	37	357	36	23,690	37	18,801	26	42,491	37	0·41	37	58,711
New Hampshire..	317,697	30	580	35	288,689	29	29,611	24	318,300	31	34·30	13	318,300
New Jersey	875,407	13	30,658	18	717,153	18	188,943	11	906,096	17	108·91	4	906,096
New York.......	4,330,210	1	52,081	17	3,244,406	1	1,138,353	1	4,382,759	1	93·25	5	4,387,464
North Carolina...	678,470	15	391,650	6	1,068,332	12	3,029	37	1,071,361	14	21·13	18	1,071,361
Ohio.............	2,601,946	3	63,213	16	2,292,767	3	372,493	4	2,665,260	3	66·69	8	2,665,260
Oregon..........	86,929	36	346	37	79,323	36	11,600	29	90,923	36	0·95	36	101,883
Pennsylvania.....	3,456,609	2	65,294	15	2,976,642	2	545,309	2	3,521,951	2	76·56	6	3,521,890
Rhode Island....	212,219	32	4,980	28	161,957	33	55,396	19	217,353	32	166·43	2	217,353
South Carolina...	289,667	31	415,814	5	697,532	19	8,074	34	705,606	22	20·75	20	705,606
Tennessee........	936,119	12	322,331	8	1,239,204	8	19,316	25	1,258,520	9	27·60	16	1,258,520
Texas...........	564,700	19	253,475	9	756,168	17	62,411	17	818,579	19	2·98	33	818,899
Vermont	329,613	29	924	32	283,396	30	47,155	22	330,551	30	32·37	14	330,551
Virginia.........	712,089	14	512,841	2	1,211,409	9	13,754	28	1,225,163	10	31·95	15	1,225,163
West Virginia....	424,033	24	17,980	22	424,923	25	17,091	27	442,014	27	19·22	25	442,014
Wisconsin	1,051,351	11	2,113	30	690,171	21	364,499	5	1,054,670	15	19·56	24	1,064,985
Total states....	33,203,128	..	4,835,106	..	32,642,612	..	5,473,029	..	38,115,641	..	19·21	..	38,203,210
TERRITORIES.													
Arizona..........	9,581	9	26	9	3,849	10	5,809	6	9,658	9	0·08	10	41,710
Colorado.........	39,221	4	456	2	33,265	4	6,599	5	39,864	4	0·38	4	47,164
Dakota..........	12,887	7	94	7	9,366	7	4,815	9	14,181	8	0·09	8	40,501
Dist. of Columbia.	88,278	2	43,404	1	115,446	1	16,254	2	131,700	1	2,057·81	1	131,700
Idaho............	10,618	8	60	8	7,114	8	7,885	4	14,999	7	0·17	6	20,583
Indian Territory.	......	..	......	..	......	..	......	..	......	..	....	..	68,152
Montana.........	18,306	6	183	4	12,616	6	7,979	3	20,595	6	0·14	7	39,895
New Mexico.....	90,393	1	172	5	86,254	2	5,620	7	91,874	2	0·76	3	111,303
Utah............	86,049	3	118	6	56,084	3	30,702	1	86,786	3	1·03	2	99,581
Washington	22,195	5	207	3	18,931	5	5,024	8	23,955	5	0·34	5	37,432
Wyoming	8,726	10	183	4	5,605	9	3,513	10	9,118	10	0·09	9	11,518
Total territories..	386,249	..	44,903	..	348,530	..	94,200	..	442,730	..	0·42	..	649,539
Total U S., exclusive of Alaska..	33,589,377	..	4,880,009	..	32,991,142	..	5,567,229	..	38,558,371	..	12·74	..	38,852,749
Alaska..........	....	..	....	..	....	..	....	..	....	..	....	..	70,461
Total United St's.	33,589,377	..	4,880,009	..	32,991,142	..	5,567,229	..	38,558,371	..	10·70	..	38,923,210

A state census was taken in Michigan in 1874, and censuses were taken by 14 states in 1875. The population according to these enumerations, except in Florida, from which the returns have not (June 1, 1876) been received, was as follows: Iowa, 1,350,544; Kansas, 528,437; Louisiana, 857,039 (404,916 white and 452,123 colored); Massachusetts, 1,651,652; Michigan, 1,334,031; Minnesota, 597,407; Nebraska, 246,280; Nevada, 52,540; New Jersey, 1,019,413; New York, 4,705,208; Oregon, 104,920; Rhode Island, 258,239; South Carolina, 925,145 (350,754 white and 574,391 colored); Wisconsin, 1,236,729. According to the census of 1870, there were 52 cities with more than 25,000 inhabitants each, of which 8 had upward of 200,000, 6 from 100,000 to 200,000, 11 from 50,000 to 100,000, and 27 from 25,000 to 50,000. Besides these there are 9 cities which, according to the state censuses named above, contained upward of 25,000 inhabitants each in 1874 or 1875. The table on the next page contains a list of these 61 cities with their population as returned by the United States census in 1870, and the population in 1874 or 1875 of such as are contained in the state censuses.

CITIES.	POPULATION.	
	1870.	1875.
New York, N. Y.	942,292	1,046,037
Philadelphia, Pa.	674,022	....
Brooklyn, N. Y.	396,099	484,616
St. Louis, Mo.	310,864	....
Chicago, Ill.	298,977	....
Baltimore, Md.	267,354	....
Boston, Mass.	250,526	341,919
Cincinnati, Ohio	216,239	....
New Orleans, La	191,418	203,439
San Francisco, Cal.	149,473	....
Buffalo, N. Y.	117,714	134,573
Washington, D. C.	109,199	....
Newark, N. J.	105,059	123,310
Louisville, Ky.	100,753	....
Cleveland, Ohio.	92,829	....
Pittsburgh, Pa	86,076	....
Jersey City, N. J.	82,546	109,227
Detroit, Mich.	79,577	*101.255
Milwaukee, Wis.	71.440	100,775
Albany, N. Y.	69,422	86.013
Providence, R. I.	68,904	100,675
Rochester, N. Y.	62,386	81,673
Allegheny, Pa.	53,180	....
Richmond, Va.	51,038	....
New Haven, Conn.	50,840	....
Charleston, S. C.	48.956	56,540
Indianapolis, Ind	48.244	....
Troy, N. Y.	46,465	48,821
Syracuse, N. Y.	43,051	48,315
Worcester, Mass.	41.105	49,265
Lowell, Mass	40,928	49,677
Memphis, Tenn.	40,226	....
Cambridge, Mass.	39.634	47,838
Hartford, Conn.	37,180	....
Scranton, Pa.	35.092	....
Reading, Pa.	33,930	....
Paterson, N. J.	33,579	38,814
Kansas City, Mo.	32,260	....
Mobile, Ala.	32.034	....
Toledo, Ohio	31,584	....
Portland, Me.	31,413	....
Columbus, Ohio.	31,274	....
Wilmington, Del.	30,841	....
Dayton, Ohio.	30,473	....
Lawrence, Mass.	28,921	34.907
Utica, N. Y.	28,804	32,070
† Charlestown, Mass.	28.323	....
Savannah, Ga.	28,235	....
Lynn, Mass.	28,233	32,600
Fall River, Mass.	26.766	45,340
Springfield, Mass.	26,703	31,053
Nashville, Tenn.	25,865	....
Salem, Mass.	24,117	25.955
Trenton, N. J.	22.874	25,031
New Bedford, Mass.	21,320	25,876
Elizabeth, N. J.	20,832	25,923
Hoboken, N. J	20,297	24.766
Camden, N. J.	20,045	33,852
St. Paul, Minn.	20,030	33,178
Grand Rapids, Mich.	16,507	*25.928
Minneapolis, Minn.	13,066	32,721

—With the exception of a small portion of the N. E. coast, the shores on the Atlantic and gulf are low, while those on the Pacific are mostly bold and rocky. The most important indentations on the Atlantic are Passamaquoddy, Frenchman's, Penobscot, Casco, Massachusetts, Cape Cod, Buzzard's, Narragansett, New York, Raritan, Delaware, and Chesapeake bays, and Long Island, Albemarle, and Pamlico sounds; on the gulf, Tampa, Appalachee, Pensacola, Mobile, Galveston, Matagorda, Espiritu Santo, Aransas, and Corpus Christi bays, with those about the delta of the Mississippi; and on the Pacific, San Diego harbor, Monterey bay, San Francisco bay, and the strait of Fuca. The length of coast line, not including indentations of the land, according to the United States coast survey, is 5,715 m., viz.: 2,349 m. on the Atlantic, 1,556 on the gulf of Mexico, and 1,810 on the Pacific. The shore line of the great lakes, according to estimates made in the coast survey office, measures 3,450 m., viz.: Superior, 955; Michigan, 1,320; Huron, 510; St. Clair, 65; Erie, 370; Ontario, 230.—The rivers of the United States may be comprised in four distinct classes: 1. The Mississippi and its affluents, which drain the region between the Alleghanies and the Rocky mountains. The chief of these affluents are: on the east, the Wisconsin, Rock, Illinois, Ohio, Yazoo, and Big Black; on the west, the Minnesota, Des Moines, Missouri, St. Francis, Arkansas, and Red river. Several of these are from 1,000 to 2,000 m. in length, while many of the secondary affluents have courses extending from 300 to 1,000 m. 2. The rivers which rise in the Alleghany chain and flow into the Atlantic. Of these, the most important, beginning at the northeast, are the Penobscot, Kennebec, Merrimack, Connecticut, Hudson, Delaware, Susquehanna, Potomac, James, Roanoke, Neuse, Cape Fear, Great Pedee, Santee, Savannah, and Altamaha, most of which exceed 300 m. in length, and are navigable to a considerable distance from the sea. 3. The rivers of the southern slope, flowing into the gulf of Mexico, the principal of which, E. of the Mississippi, are the Appalachicola, Mobile, and Pearl, and W. of the Mississippi, the Sabine, Neches, Trinity, Brazos, Colorado, Nueces, and Rio Grande (which forms the boundary between Texas and Mexico). 4. The rivers which flow into the Pacific, of which the most important are the Columbia, which has several large affluents; the Sacramento and the San Joaquin, which flow into the bay of San Francisco, and drain the fertile valley between the Sierra Nevada and Coast mountains; and the great Colorado of the West, which has its terminus in the gulf of California, and drains the region between the Wahsatch and Rocky mountains. Besides these may be mentioned the shallow streams of the Great Basin, which have no outlet to the ocean; the Red river of the North, which empties into Lake Winnipeg in British America; the St. Lawrence, which forms part of the boundary between New York and Canada, and discharges the waters of the great lakes and their affluents; the St. John and St. Croix, which form part of the boundary between Maine and New Brunswick; and the St. John's, in Florida. Few countries in the world contain so many lakes as the United States, though these are principally confined to the northern portion. Of the five great lakes, as they are called, the largest bodies of fresh water on the globe, with perhaps the exception of the newly discovered and imperfectly known lakes in the interior of Africa, four, viz., Superior, Huron, Erie, and Ontario, lie on the northern border, partly in the United States and partly in British America, while

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* 1874.

† Annexed to Boston in 1874.

Lake Michigan is wholly within the territory of the republic; so is nearly all of Lake Champlain. Near the S. end of the last, in New York, is Lake George, renowned for its beautiful scenery, a feature equally characteristic of other lakes in the neighboring wilderness of the Adirondacks and in New England. Among the last mentioned, the most important are Moosehead in Maine, Winnipiseogee in New Hampshire, and Memphremagog, partly in Vermont and partly in Canada. The central parts of Maine are thickly strewn with lakes of great beauty and considerable size; and in almost every part of New England sheets of water are abundantly found under the designation of ponds, which in Europe from their size and beauty would be classed as lakes. The central and western parts of New York contain several large lakes, the most remarkable of which are Otsego, Oneida, Skaneateles, Cayuga, Seneca, Keuka (formerly Crooked), and Chautauqua. In the southern states lakes of fresh water are rarely found except in Florida, where the principal is Okeechobee, and in Louisiana, where there are many lakes formed by expansions of the numerous rivers. In the states of the northwest, lakes are very numerous in Michigan, Wisconsin, and Minnesota; the great number and size of those in the last form indeed one of its most remarkable geographical features. The most noted on the Pacific slope is Great Salt lake. In the Great Basin, in Utah and Nevada, are many other lakes or sloughs, most of which, like this, are salt. In California and E. Oregon are several similar bodies of water. The area of the United States, with reference to its watersheds, is divided, according to Walker's "Statistical Atlas of the United States," as follows: 1. The Pacific slope, 854,314 sq. m., including the basin of the Columbia, 219,706 sq. m.; Great Basin, 210,274; basin of the Colorado of the West, 264,386; coast basins, 159,948. 2. The Mississippi valley, 1,257,545 sq. m., including the Missouri basin, 527,690 sq. m.; upper Mississippi, 179,635; Ohio, 207,111; Arkansas, 184,742; Red river, 92,721; lower Mississippi, 65,646. 3. The gulf slope W. of the Mississippi, 279,768 sq. m., of which the Rio Grande basin occupies 101,334, and the gulf slope E. of the Mississippi 145,990 sq. m. 4. The Atlantic slope proper, 304,538 sq. m. 5. The basins of the St. Lawrence and Red river of the North, 184,339 sq. m.—The United States is crossed in a general N. and S. direction by two great systems of mountains, the Rocky mountains in the west and the Appalachian or Alleghany chain in the east, between which is the extensive and fertile Mississippi valley. The great mass of the Rocky mountain system is W. of the 105th meridian. Its two main chains are the Rocky mountains proper, extending through New Mexico, Colorado, Wyoming, and Montana, and the Sierra Nevada in California, with its extension, the Cascade range, in Oregon and Washington territory. Between these two chains is a plateau, crossed by numerous mountain ranges, which through its centre E. and W. is from 4,000 to 5,000 ft. high, falling off toward the north and south from that line. The Wahsatch mountains are the most important range of the plateau. They extend S. and S. W. through Utah and S. E. Nevada, and form the E. rim of the Great Basin, the W. rim being the Sierra Nevada. They rise from 4,000 to 6,000 ft. above the plateau, Mt. Nebo being 11,992 ft. high. The Blue mountains in E. Oregon are little known. The most elevated portion of the plateau is between the Wahsatch and Rocky mountains, and embraces the Colorado "parks" and the Laramie plains in Wyoming. The average elevation here is from 7,000 to 9,000 ft., being greatest on the N. edge of the South park, whence there is a gentle decline in either direction. The loftiest portion of the Rocky mountains is in Colorado, where there are many peaks upward of 14,000 ft. high. The Wind River mountains in N. W. Wyoming, and the Bitter Root mountains, forming part of the boundary between Idaho and Montana, are important spurs of this chain. In the Wind River mountains rise the Missouri river, the Green river, forming the main branch of the Colorado of the West, and the Snake, one of the main branches of the Columbia. The Black hills, on the border of Wyoming and Dakota, may be considered an outlying group of the Rocky mountains. The Sierra Nevada and Cascade mountains run nearly parallel with the Pacific coast, from 100 to 150 m. from it. In the former are several peaks more than 14,000 ft. high, Mt. Whitney (14,887 ft.) being the highest in the United States. The Coast range is the westernmost of the Rocky mountain system, running through California, Oregon, and Washington territory, at a distance of from 10 to 50 m. from the coast. It averages from 2,000 to 3,000 ft. in height, but a few peaks rise more than twice as high, and Mt. San Bernardino, the loftiest (which is however not generally considered as belonging to the Coast range), to an elevation of 11,600 ft. The Rocky mountain system embraces an area of nearly 1,000,000 sq. m. It is widest between the 36th and 41st parallels, where the breadth is from 800 to 1,000 m. It is lowest along the 32d parallel, where the greatest elevation is not more than 4,000 ft. The Appalachian chain extends S. W. from Canada to Alabama. It includes among other ranges the Green mountains in Vermont, the Catskills in New York, the Blue Ridge in Virginia, the Black mountains in North Carolina, and as outlying spurs the White mountains in New Hampshire and the Adirondacks in New York. Mt. Washington in the White mountains is 6,293 ft. high (according to Prof. Hitchcock); the loftiest peak of the chain is the Black Dome in the Black mountains, about 6,700 ft. The greatest width of the chain, not including outliers, is 100 m., in Pennsylvania and Maryland. The height of the plain at the base is 500 ft. in New England, and becomes 1,200 ft. S. of Virginia; the W. base in Virginia and Tennessee is from 1,000 to 2,000 ft. high. The Appalachians make their nearest approach to the sea in the Highlands on the Hudson, which are about 30 m. from Long Island sound; in the south the distance from the coast is 200 m. The Atlantic slope, between the Appalachians and the ocean, is in general hilly, with level tracts near the shore, particularly in the south. The great central district between the two mountain systems is a region of prairies and plains, sloping from each toward the Mississippi river, with a gentle southern decline to the gulf of Mexico. A portion in the northeast slopes toward the great lakes, and the basin of the Red river of the North toward the north. The elevation at the base of the Rocky mountains in Montana is 4,091 ft.; at the mouth of the Yellowstone river, on the border of Montana and Dakota, 2,010 ft.; at Denver, Colorado, 5,267 ft.; of the Llano Estacado in Texas and New Mexico, 3,200 to 4,700 ft.; of the source of the Mississippi in Minnesota, 1,680 ft.—Some details of the distribution of the great geological formations over the territory of the Union, and the relations of these to its geography, have already been given in the article Geology, vol. vii., p. 695. It is there stated that the eozoic formations bearing the names of Laurentian, Huronian, Montalban, and Norian make up the Atlantic belt of the Appalachians, extending from E. Canada through New England and E. New York to N. E. Alabama. To these eozoic groups belong the White mountains, the Green mountains, the Adirondacks, the Highlands of New York and New Jersey, the South mountain of Pennsylvania, and its continuation south of the Potomac, the Blue Ridge. The lower levels of E. New England are also, with some exceptions, occupied by eozoic rocks, and the same is true of a broad belt of rolling country between the E. base of the Blue Ridge and the low lands of the coast. In addition to what has been said with regard to the distribution of the various formations over this area, it may be noted that rocks of the Laurentian age extend from the Hudson to the Schuylkill, while further southward Huronian and Montalban rocks prevail, including however a belt of Laurentian in Virginia. Westward from the Adirondacks eozoic rocks, embracing the four great types already mentioned, extend through Canada to N. Michigan and Wisconsin, while southward they reappear in the Ozark mountains of Arkansas, and also in small areas in Missouri. In the Rocky mountains eozoic rocks appear which seem to be identical in their character with those of the Appalachians, but have not yet been critically studied. At the W. base of the Green mountains, and thence extending along the W. flank of the South mountain and the Blue Ridge as far as Georgia, is a series of rocks to which Prof. Emmons gave the name of the Taconic system. He described them as having a total thickness of about 20,000 ft. and consisting of an upper and a lower division; the latter consisting of sandstones and quartzites, followed by a great mass of limestones interstratified with and overlaid by argillaceous and magnesian schists, and destitute of fossils; while the upper division, including sandstones, slates, and limestones, contained a palæozoic fauna supposed by him to be older than that of the Potsdam and calciferous of New York, which latter were declared to overlie unconformably the Taconic system. These views were opposed by most American geologists, and chiefly by Mather, H. D. Rogers, and Logan. According to these authorities, the whole Taconic system represented in a modified condition the middle and upper Cambrian rocks, from the Potsdam to the Oneida. (See Geology, tabular view, vol. vii., p. 694.) Later researches have confirmed the views of Emmons as to the antiquity of a portion of the fauna of the upper Taconic rocks, while the lower Taconic may correspond to the lower Cambrian of Europe, or perhaps to a still earlier period more closely related to the eozoic rocks already noticed. These rocks are important as making up the chief part of the floor of the great Appalachian valley from Lake Champlain to Georgia, a region remarkable for fertility of soil and for the great deposits of brown hematite (limonite) iron ore which belong to the lower Taconic strata. The American subdivisions of the middle and upper Cambrian rocks, from the Potsdam to the summit of the Loraine (or Hudson river) shales, appear in their characteristic forms in the valleys of the Mohawk and the St. Lawrence. From this great plain around the base of the Adirondacks they extend westward to the Mississippi valley, and thence southward as far as Texas. They are also found at intervals along the eastern border of the palæozoic basin as far as Tennessee, but their precise relations to the Taconic rocks along this line are still involved in discussion. The base of the next great palæozoic division, the Silurian proper, is the Oneida, which rests unconformably upon the preceding, and, being a strong and massive sandstone or conglomerate, gives rise to a conspicuous ridge along the eastern border of the basin. It forms the Shawangunk mountains of S. E. New York and the Kittatinny mountain of Pennsylvania, stretching thence southward and bounding the great Appalachian valley on its N. and W. side, while the crystalline rocks of the South mountain and the Blue Ridge enclose it on the south and east. The whole eastern portion of the great palæozoic basin has been much disturbed by undulations of the strata having a general N. E. and S. W. direction, often complicated by fractures with great vertical displacements of the strata, which may be described as upthrows on the N. W. side of the faults. This disturbed region includes the whole of the palæozoic series to the top of the coal, embracing various massive sandstones and conglomerates. As the combined result of these disturbances and the subsequent erosion of the surface, the whole region has been converted into a mountainous belt of parallel ridges, extending along the N. W. side of the great Appalachian valley from the Catskill mountains of New York throughout all its length, and constituting the Alleghany mountain belt, of which the Kittatinny may be considered as the eastern limit. In this disturbed region occur the anthracite and semi-bituminous coal basins of Pennsylvania, Maryland, and Virginia, and the dislocations just alluded to are in repeated instances so great as to bring up the base of the palæozoic series on the N. W. side of the detached areas of coal. To the westward these disturbances become less and less marked, and the Devonian and carboniferous rocks are seen comparatively undisturbed. Further to the west we reach the Cincinnati axis, which is traced from Lake Ontario to N. Alabama, and brings up on a gentle anticlinal the upper Cambrian beds, known in this region as the Cincinnati group, from Cincinnati with some interruptions to Nashville, Tenn. Further southward it sinks beneath the coal formation of Alabama. To the east of this great dividing line extends the Appalachian coal field from Alabama through E. Tennessee, Kentucky, and Ohio, including West Virginia and the W. half of Pennsylvania; while to the west of it are three other palæozoic coal fields, that of Michigan, that of Illinois, including parts of Indiana and western Kentucky, and that west of the Mississippi, extending from Iowa, through Missouri, Kansas, and Arkansas, into Texas. (See Coal.) To the westward of this last coal field are great areas of newer rocks of triassic, Jurassic, cretaceous, and tertiary periods, which extend to the base of the Rocky mountains and beyond. The cretaceous and tertiary strata, after stretching southward through Texas, reach up the Mississippi valley as far as the mouth of the Ohio, eastward along the gulf of Mexico, and thence northward to the coast of Massachusetts, in a belt of gradually diminishing breadth, including Long Island and a part of Martha's Vineyard. The valley of the Mississippi, with the greater part of Florida and a border of varying width along the seaboard, is overlaid with deposits which are regarded as post-tertiary. The whole of these newer strata along the Atlantic region rest in a nearly horizontal attitude on the eozoic and palæozoic rocks. The cretaceous strata are in many parts concealed, but are recognized along the N. portion of Long Island, and pass across New Jersey and N. Delaware to the head of Chesapeake bay. Thence they are exposed at a few points in E. Virginia, the Carolinas, and Georgia, till in the W. part of this state they appear in a broad belt extending through central Alabama and curving northward through N. Mississippi and E. Tennessee. These newer rocks along the Atlantic coast form the tide-water region, and are nowhere affected by the movements which have disturbed the older rocks. What has been called the new red sandstone formation of the Atlantic belt extends in a narrow line from N. Massachusetts along the Connecticut valley to New Haven. It is again continued from the Hudson across New Jersey and Pennsylvania into Virginia, and is found in smaller areas in S. E. Virginia and in North Carolina. From its organic remains this sandstone is regarded as lower mesozoic, probably including the triassic and Jurassic periods. In Virginia and in North Carolina it includes beds of workable coal, which rest upon the eozoic crystalline rocks. In a similar relation there is a considerable area of coal-bearing rocks in Rhode Island and Massachusetts, which are however of palæozoic age like the coals of the Appalachian field. Small areas of fossiliferous lower Cambrian, Silurian, and Devonian are found in various localities among the crystalline rocks of New England. Over the N. E. portions of the United States is widely spread the so-called drift formation or diluvium of post-pliocene age (see Diluvium), consisting of unstratified bowlder drift and modified or stratified drift. The southern limit of these deposits and of the marks of glaciation is about lat. 40° N. The crystalline rocks to the north of them present hard, smoothly worn, or striated surfaces, except in some protected localities; but further southward they are generally decayed or softened to a greater or less depth, sometimes 100 ft. or more, from a process of chemical change. The great elevated western or Rocky mountain region differs widely in general features from that just described. Upon the broad area of crystalline rocks, which reproduce on a grand scale the characteristics of the Appalachian belt, are found all the members of the palæozoic series, overlaid for the most part by older mesozoic rocks and by a great thickness of cretaceous and tertiary strata, in which each one of the three great divisions of the latter is well represented. These newer rocks constitute vast arid plains, and in the cretaceous and eocene or lower tertiary strata the great coal deposits of this region are found. These strata have been disturbed by great faults, penetrated and overflowed by vast volumes of eruptive rocks, and subjected to erosion on a grand scale. The crystalline rocks which bound the great palæozoic basin of the United States to the east and the north are rich in ores of iron, and include also gold, copper, lead, nickel, and chrome. The native copper of the S. shore of Lake Superior belongs to a peculiar group of strata, unknown elsewhere, lying at the very base of the palæozoic series. Various horizons in the palæozoic rocks, up to the coal inclusive, abound in ores of iron, and in the Mississippi valley in lead, zinc, and copper; while salt and petroleum occur at several horizons in the palæozoic series in different parts of the great basin. The western or Rocky mountain region is the great source of the precious metals, the deposits of which, as has been observed, may be described in a general way as arranged in parallel zones coinciding with the mountain belts. Along the Pacific Coast range are deposits of quicksilver, tin, and chrome, while the belt of the Sierra Nevada and the Cascades carries a range of copper mines near its base, and a line of gold-bearing veins and gold alluvium on its western flank. Along the E. slope of the Sierra lies a zone of silver mines stretching into Mexico, and including the great Comstock lode of Nevada, while silver ores abound in the subordinate ranges between the Sierra and the Wahsatch. The silver-lead ores of New Mexico, Utah, and western Montana, and the still more eastern gold deposits of New Mexico, Colorado, Wyoming, and Montana, follow the same general distribution. (For particulars of the mineral deposits of the United States, see ANTHRACITE, BORAX, COAL, COPPER MINES, GYPSUM, IRON ORE, MARBLE, PETROLEUM, SALT, and the articles on the different metals and states.)—The republic abounds in natural curiosities and other objects of interest. Immense numbers of persons annually resort to the mineral springs, the most prominent of which are mentioned in the article MINERAL SPRINGS. The White mountains and other portions of the Appalachian chain are noted for their striking or picturesque scenery; while the great mountain ranges of the Pacific slope present innumerable scenes of unsurpassed beauty and sublimity, among which are the "parks" and lofty peaks of Colorado, the Yellowstone national park in Wyoming, and the Yosemite valley in California. The prairies and arid plains are noteworthy features. Besides the great cataract of Niagara and the Yosemite falls, the falls of the Missouri in Montana, St. Anthony's falls of the Mississippi in Minnesota, and the falls of the Snake river in Idaho may be instanced. The most remarkable caves are the Mammoth cave in Kentucky; Madison's cave and Weyer's cave, Virginia; Nicojack cave, Georgia; and Fountain cave, near St. Paul, Minnesota. Not the least interesting among the picturesque features of the country are the remarkable channels cut by some of the rivers through ranges of hills or rocky ridges. Such are the passage of the Hudson through the Highlands of New York; the Delaware Water Gap; the passage of the Potomac through the Blue Ridge at Harper's Ferry; the "gates of the Rocky mountains" on the upper course of the Missouri in Montana; the deep cañons of the Colorado of the West; and the "cascades" where the Columbia river breaks through the Cascade range on the boundary between Washington territory and Oregon. The natural bridge of Virginia, the pictured rocks on the shore of Lake Superior in Michigan, the mammoth trees of California, the geysers, and the popular seaside resorts, as well as nearly all the scenes above mentioned, are described in other articles.—The climate of the United States is as varied as might be expected in a country stretching through 25 degrees of latitude, and rising from low swampy shores to vast elevated and arid table lands and prodigious mountain ranges. Except in the extreme south and on the Pacific coast, it is characterized by fickleness and by great difference in temperature between summer and winter. Transitions from heat to cold and from cold to heat, to the extent of 30° in a few hours, are common at all seasons, and the alternations from rain to drought are nearly as remarkable. The summer is marked by intense heat, the thermometer rising sometimes several degrees above 100° F. In the north this extreme is seldom continued for more than a few days at a time, and in the southern states the heat, though long continued, is seldom so great. In winter the thermometer often falls below zero in the north, and it has been known, particularly in Minnesota and Dakota, to reach the freezing point of mercury (—40°). The Atlantic states have in general a temperature about 10° more severe than countries of the same latitude in western Europe, while California has a climate as mild as that of Italy. The northeastern states are subject to chill winds from the Atlantic (and at points along the coast to fogs), especially in the spring months; and the ice fields of British North America are the cradle of cold blasts which, having no mountain barrier to overcome, sweep over the northern states upon every considerable rise in the temperature further south. The great lakes mitigate to some extent the temperature of the country surrounding them, and other local features, such as the elevated plains and lofty ranges of the Rocky mountain system, affect the climate of particular parts of the country. The average annual temperature varies from 76° in S. Florida to 36° in N. E. Minnesota. The isothermal lines are irregular, but between the Pacific and the upper Mississippi they have a general tendency toward the north. On the Pacific coast the annual temperature of 52° in lat. 48° corresponds to a like temperature on the Atlantic coast in lat. 41.° Rain is abundant over the greater part of the republic, and pretty equally distributed throughout the year. In the north Atlantic states the fall is more regular than in the coast states S. of Washington, being in the latter more plentiful than in the former, and more frequent in summer than in winter. On the Pacific coast the rains are periodical, occurring chiefly in winter and spring, and S. of lat. 40° in autumn also. In the northern states snow frequently falls to a considerable depth, and in the most northerly portions it does not melt until spring. It is comparatively rare S. of the Potomac and on the Pacific coast, and when it does occur in these districts it lasts but a short time. The average annual precipitation of rain and melted snow on the Atlantic coast and on the gulf as far W. as the Sabine river varies from 36 to 60 inches, being generally from 40 to 50 inches; in the greater part of Texas and in the Mississippi valley it is from 24 to 50 inches, diminishing toward the north and west. The greatest precipitation occurs in Oregon and Washington territory, between the Coast mountains and the Pacific, varying from 80 inches in the N. part of the latter to 68 in the former. Between the Coast and Cascade mountains it is from 24 to 44 inches, and in N. California from 20 to 36, diminishing in the S. portion of that state. In the region bounded W. by the Cascade and Sierra Nevada mountains and E. by an irregular line commencing at the 95th meridian in N. Minnesota, and intersecting the 101st meridian in N. W. Texas, it does not exceed 20 inches, and is generally much less than that. Very little of this fall occurs in summer, and irrigation is a necessary adjunct to agriculture. In the mountains of this region snow falls to a great depth in winter. —The most fatal diseases of the New England and middle states are affections of the lungs; of the southern states, bilious fevers, with occasional severe visitations of yellow fever along the gulf; and of the western states, intermittent and bilious fevers and dysentery. The fever and ague so prevalent in the west is attributed to the miasmatic exhalations incident to the breaking up of new lands, and rapidly disappears as the country becomes settled. The cholera has generally been more fatal in the valley of the Mississippi than in any other part of the country.—The soil presents almost every variety, from the dry sterile plains in the region of the Great Salt lake to the rich alluviums of the Mississippi valley. It can most conveniently be described by following the seven great divisions indicated by the river systems of the country, viz.: the St. Lawrence basin, the Atlantic slope, the Mississippi valley, the Texas slope, the Pacific slope, the inland basin of Utah, commonly called the Great Basin, and the basin of the Red river of the North. 1. The St. Lawrence basin embraces parts of Vermont, New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, and Minnesota, and all of Michigan; it is an elevated and fertile plain, generally well wooded. 2. The Atlantic slope includes all New England except a part of Vermont: all of New Jersey, Delaware, the District of Columbia, South Carolina, and Florida; and portions of New York, Pennsylvania, Maryland, Virginia, West Virginia, North Carolina, Georgia, Alabama, and Mississippi. It may be subdivided into two regions, a N. E. section and a S. W. section, separated by the Hudson river. The former is hilly, and generally better adapted to grazing than tillage, though some parts of it are naturally fertile, and a large proportion is carefully cultivated. The S. W. section may be again divided into a coast belt from 30 to 150 m. in width, running from Long Island sound to the mouth of the Mississippi, and including the whole peninsula of Florida; and an inland slope from the mountains toward this coast belt. The former as far S. as the Roanoke river is sandy and not naturally fertile, though capable of being made highly productive; from the Roanoke to the Mississippi it is generally swampy, with sandy tracts here and there, and a considerable proportion of rich alluvial soil. The inland slope is one of the finest districts in the United States, the soil consisting for the most part of alluvium from the mountains and the decomposed primitive rocks which underlie the surface. 3. The Mississippi valley occupies more than two fifths of the area of the republic, and extends from the Alleghany to the Rocky mountains, and from the gulf of Mexico to British North America, thus including parts of New York, Pennsylvania, Maryland, Virginia, West Virginia, North Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, New Mexico, Colorado, Wyoming, Montana, Dakota, Ohio, Indiana, Illinois, Wisconsin, and Minnesota, and all of Kentucky, Tennessee, Arkansas, Indian territory, Missouri, Iowa, Nebraska, and Kansas. It is for the most part a prairie country, of fertility unsurpassed by any region on the globe, except perhaps the valley of the Amazon. The ground in many places is covered with mould to the depth of several feet, in some instances 25 ft. But the N. W. part of the valley offers a strong contrast to the remainder. There is a plateau from 200 to 400 m. wide lying at the base of the Rocky mountains, part of it incapable of cultivation on account of the deficiency of rain and lack of means of irrigation, and part naturally sterile. 4. The Texas slope includes the country S. W. of the Mississippi valley, drained by rivers which flow into the gulf of Mexico, and embracing nearly all of Texas and portions of Louisiana and New Mexico. (See Texas.) 5. The Pacific slope, embracing the greater part of California, Oregon, and Idaho, with Washington territory and Arizona, and parts of New Mexico, Utah, Colorado, Wyoming, and Montana, is generally sterile. That part however between the Coast range and the ocean, and the valleys between the Coast range and the Cascade range and Sierra Nevada are very fertile; and the same may be said of a few other valleys and mountain slopes, though these are commonly better adapted to pasturage than to agriculture. 6. The great inland basin of Utah, which besides Utah includes Nevada and parts of California, Oregon, and Idaho, is probably the most desolate portion of the United States, though in parts the soil with irrigation yields good crops, and grazing may be more extensively pursued. It abounds in salt lakes. 7. That portion of the basin of the Red river of the North which belongs to the United States is confined to the small tract in the N. part of Dakota and Minnesota; it contains some very productive lands, especially in the river bottoms.—The varied physical aspects of the country indicate a correspondingly varied ve-

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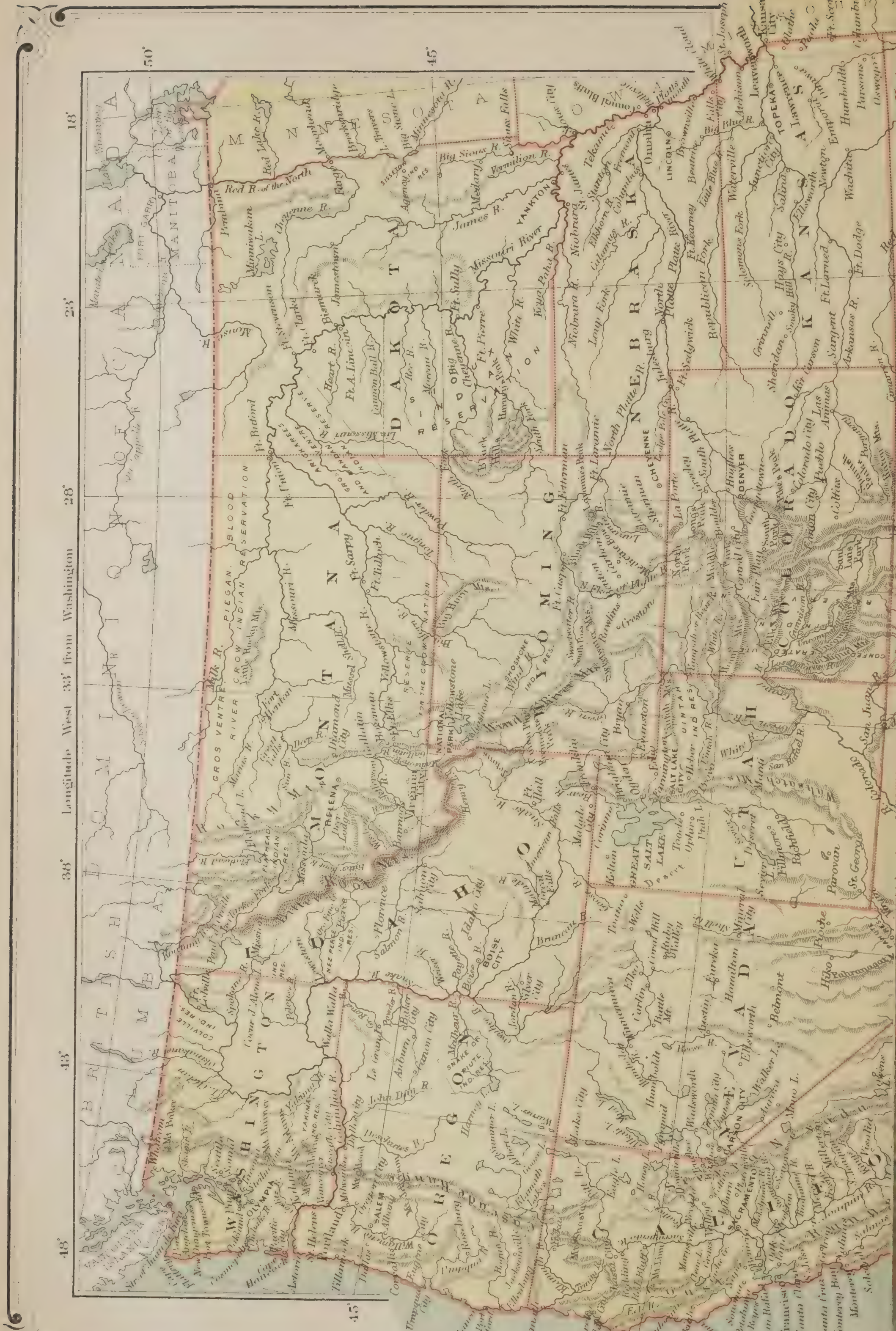
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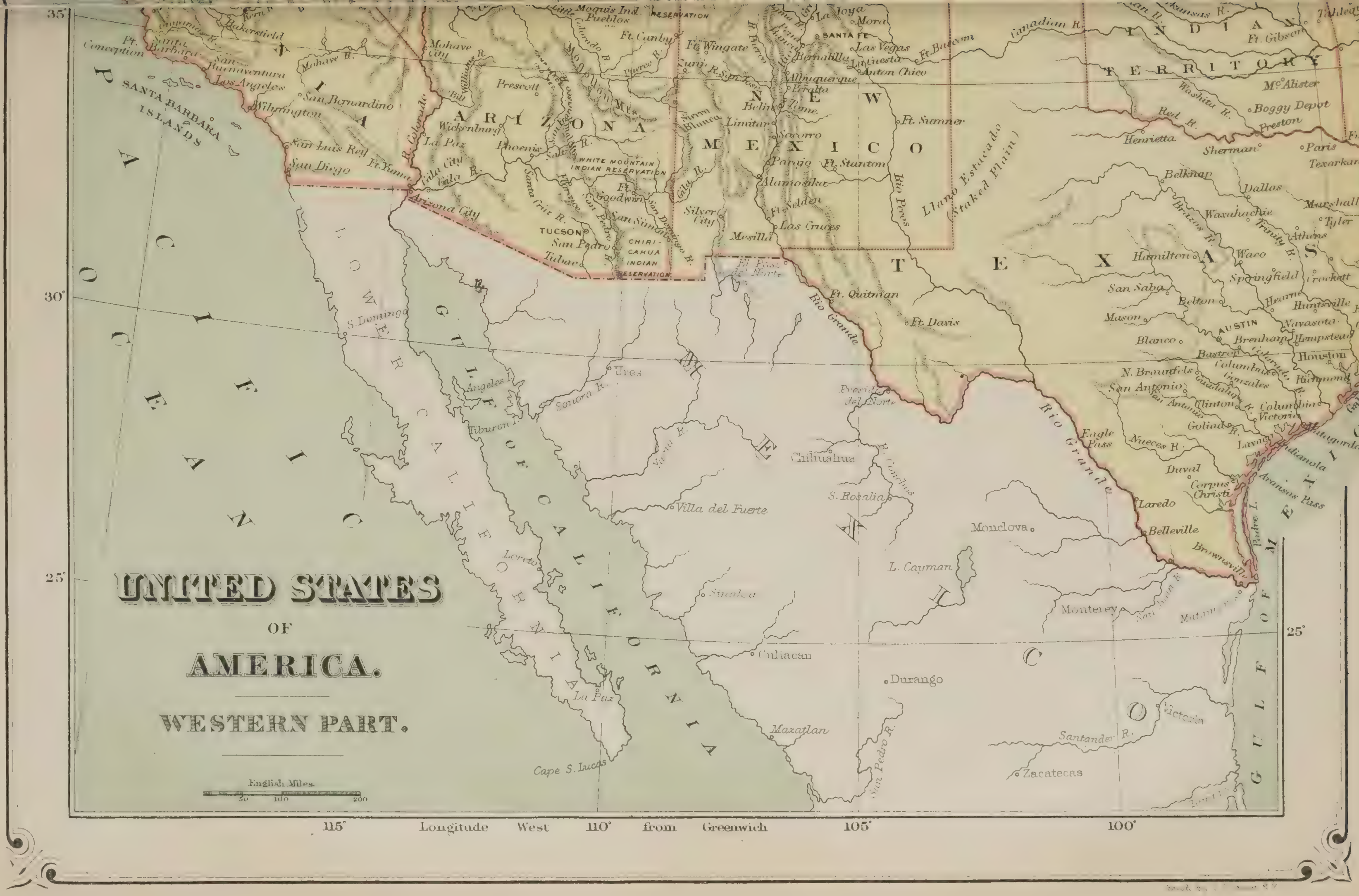
SACRAMENTO
San Francisco
GROS VENTRE RIVER CROW INDIAN RESERVATION
PIEGAN BLOOD INDIAN RESERVATION
NATIONAL PARK
GREAT SALT LAKE
Missouri River
Yellowstone R.
Snake R.
Columbia R.
Red R. of the North

UNITED STATES OF AMERICA.

WESTERN PART.



getation, and an elaborate survey of its botanical features would require its subdivision into 20 or more regions characterized by the prevailing vegetable forms; but a mere glance at a few broad geographical divisions must suffice, noticing only the more conspicuous flowering plants. 1. The northern states, east of the Mississippi, from the northern border to Virginia and Kentucky, present a flora essentially European in its general aspects, though it is largely wanting in the alpine and subalpine plants so common in northern Europe. Our alpine or arctic flora (excepting that of Alaska) is confined to the limited areas presented by the tops of the higher mountains of New England and New York; and of the little over 30 species found on these, only 4 are peculiarly American. The trees of this division are largely of European genera; the pine, spruce, birch, oak, maple, ash, elm, and others, which make up the bulk of the forest growth, are also the prevailing genera of Europe, but they are mostly represented here by different species. The principal trees not of European genera are the magnolias, tulip tree, yellowwood, buckeye, locust, honey locust, liquidambar, tupelo, sassafras, and all the hickories; while among the conifers are the arbor vitæ and the hemlock spruce, which by some botanists is placed in a genus distinct from the spruces. Abundant shrubs of European genera are sumachs, thorns, azaleas, rhododendrons, dogwoods, whortleberries, blackberries, &c.; while the laurel (*Kalmia*), papaw (*asimina*), prickly ash, witch hazel, spice bush, leatherwood, buffalo berry, and others, are peculiarly American. As in most floras, the *compositæ* are here very numerous, one eighth of all the species belonging to this family; some of these, as the solidagos, asters, sunflowers, and others, are so abundant as to give a warm coloring to the autumn landscape. Two or three cacti and one pitcher plant, and the mistletoe, genera very abundant in other regions, are found here. A remarkable analogy has been noticed between the flora of the eastern coast of this continent and corresponding portions of eastern Asia, many of the genera of this region being found elsewhere only in Japan, China, and the Himalayas. The flora of this division gradually blends with that of the next. 2. The southern states, from the preceding to the gulf of Mexico, exclusive of southern Florida. Along the mountains northern plants extend far southward. Among southern species of northern genera of trees, the most conspicuous are the great magnolia (*M. grandiflora*), one of the finest of evergreen trees, the live oak, so valued for timber, and the old-field and long-leaved pines; the pecan, really a hickory, abounds here, and the planer tree, hackberry, persimmon, and holly, not common at the north, have here their centres of greatest abundance; the deciduous or bald cypress, barely a native of the northern region, is here abundant and valuable. Among the trees of genera not found in the northern division are Osage orange, catalpa, wild China, sorrel tree, Georgia bark, devilwood, and alligator pear. Torreya is a very local conifer; and of the four palms, the cabbage palmetto may be ranked as a tree; a grass, the giant cane, often reaches 20 to 30 ft., and forms dense jungles known as canebrakes. The herbaceous plants present great attractions to the botanist, and some from their contrast with northern forms arrest the attention of the unbotanical traveller. Long or Spanish moss is a true epiphyte, and hangs from the trees in such abundance as to form a feature in the scenery; and other tillandsias, several ferns, and two orchids are other epiphytes to be met with in the far south. This region is the home of the pitcher plants (*Sarracenia*), and of the very local Venus's fly trap (*Dionæa*), the most wonderful of all carnivorous plants. The bright colors of the coral plant, several species of hibiscus, the Carolina pink (*Spigelia*), the abundance of phloxes, gerardias, and convolvuluses, and the fragrance of the Carolina jasmine (*gelsemium*), remind the northerner that he is surrounded by a new flora. 3. Southern Florida, especially the "keys," presents very distinct features, the trees particularly being those characteristic of the West Indies. Conspicuous among these are the mangrove (also found elsewhere along the gulf), the mahogany and lignum vitæ trees, the poisonous manchineel, several small-fruited figs, the tropical papaw (*Carica*), calabash, and many others. In the Florida arrowroot or coontie (*zamia*) is found our only representative of the cycads. The orange grows here as a naturalized plant in such abundance that many regard it as a native. 4. The plains west of the Mississippi, and the Rocky mountains. Immediately west of the Mississippi the flora is not widely different from that on the eastern side; but as the wide plains and the elevated dry plateaus are reached, a different vegetation appears, while that of the Rocky mountains is mainly unlike that of the high eastern peaks; some wide districts have the soil so strongly impregnated with alkali that few plants can exist. The plains are mostly destitute of trees, except along the courses of the streams, where the cottonwoods (species of poplar) are most abundant. Here are found wide areas of single or few species; on the more fertile portions the buffalo grass covers vast tracts, multiplying so freely by its spreading stems that it rarely produces seed. On the sterile portions the "everlasting sage brush" (*Artemisia tridentata*) gives a sombre hue as far as the eye can reach; the "greasewood" of the travellers (*sarcobatus*) and other chenopods are often abundant; plants of this family, with a few composites, grasses, and sedges, make up the flora of the wide alkaline stretches. On the more fertile plains the leguminous plants, and those of the phlox and evening primrose families, are frequent. The mountains afford a rich and varied flora; here are found a great variety of pines, spruces, and firs, and above them a truly alpine region, which has enriched our flora with a long list of choice species. 5. The Pacific coast, with the neighboring mountain ranges, within the influence of the mild atmosphere of the ocean, has a wonderfully varied flora. Among trees, maples, buckeye, cherry, buttonwood, oaks in great number, chestnut, birches, willows, and others of genera common to the northern states of the east, are here represented by species peculiar to the coast. The conifers of this region are among the loftiest; and pines, spruces, firs, cypresses, and arborvitæs make up an arboreal vegetation of great variety and interest. Among the trees of genera not found in the other divisions are the madroña, sometimes called strawberry tree, a magnificent broad-leaved evergreen (*arbutus Menziesii*), and the California laurel or bay (*oreodaphne*). The genus *Torreya*, of which there is a species in Florida, is represented here by the "nutmeg tree;" California white cedar, sometimes reaching 140 ft., is a *libocedrus;* here is the home of the sequoias or redwoods, of which *S. gigantea*, widely known as the mammoth tree, towering from 300 to 450 ft., is one of the two largest trees of the world. The shrubby growth of this region presents numerous species of eastern genera, and is equally varied. Among herbaceous plants, the range from the coast to the mountain tops is wide, and presents a flora so rich that the labors of botanists have not yet exhausted it. Many of the choice ornaments of our gardens, eschscholtzias, gilias, nemophilas, the mimulus, whitlavia, collomia, lupines, pentstemons, and others, have here their homes; perhaps the most interesting plant of this region is the *Darlingtonia*, a pitcher plant of curious structure, and, like its eastern relatives the sarracenias, carnivorous. A marked feature of the flora of this region is the wide areas occupied by single species, almost to the exclusion of all others. A great many interesting native grasses are found here. 6. Western Texas, 200 m. from the coast, is a high plateau, and with the lower parts of New Mexico and Arizona forms a region the vegetation of which is more like that of Mexico than of any other part of the United States; it is a region of elevated table lands, cut up by sterile mountain ranges, with but few streams and very little rain. Along the watercourses are found cottonwoods and willows, but the majority of the few trees which occur elsewhere are of the *leguminosæ*, the most frequent being the mezquite and the related screw bean; these and the *tesota* or ironwood (*Olneya*), *palo verde* or green tree (*cercidium* and *Parkinsonia*), cassias, and others, the Mexican pistachio, Spanish buckeye (*Ungnadia*), mulberry, and a few others, make up the tree growth, except in the mountains, where in favorable localities pines, oaks, &c., occur. The shrubs are numerous, and, in common with other vegetation, abundantly armed with prickles and spines; some shrubs, such as *Kœberlinia* and *holocantha*, rarely show any leaves, the green bark answering their purpose, but have every branch and twig sharpened to form a formidable spine, and the leafy shrubs often have their branches thus terminated, or are furnished with special thorns; a thick growth of these spinescent shrubs is known as "chaparral," and forms an impenetrable barrier to man and beast. In this division are found agaves, dasylirions, and yuccas, some reaching the stature of a tree. The most characteristic plants of a large part of this region are the cacti, which occur in a great number of species presenting a wide variety of forms and size. Opuntias of the prickly pear style are numerous; some are 6 ft. high, others with cylindrical stems are scarcely bigger than a quill, while the tree-like *O. arborescens* is as large as an apple tree. Species of the globular mammillarias are not larger than a walnut, while some of the oblong echinocacti are of the size of a barrel; all these are dwarfed by the giant cereus, the candelabra-like stems of which sometimes reach 40 or 50 ft. In some localities almost the whole vegetation is made up of these plants, which present nature in her most grotesque aspect.—Flowerless or cryptogamous plants, especially those of a lower organization, are much less restricted in their distribution than flowering plants. Among the higher orders of these, the ferns and club mosses, many of the genera and also of the species are the same as those of Europe, and in the mosses, lichens, and lower forms the number of European species is still greater; but all these families present a large number of peculiarly American genera, and American species of European genera. Among ferns, the most noticeable of the northern and southern states are the maiden-hair (*adiantum*), the walking fern (*camptosorus*), the climbing fern (*lygodium*), the golden fern (*polypodium aureum*), and the so-called sensitive fern (*onoclea*). The smallest of our ferns is *schizæa*, very local in New Jersey, and one of the most striking is *vittaria*, an epiphyte in Florida, the fronds of which are more like a tuft of grass than a fern. The Pacific coast, the Rocky mountains, and even the desert region of Arizona, have their peculiar species. In mosses and hepaticas the country is very rich, and in these as well as in lichens the few botanists who devote themselves to their special study are continually adding to the number of known species. The fungi, though but partially investigated, are numerous, with a large number of edible species among them. In algæ the Atlantic coast, while it has many that are common to the shores of Europe, produces its peculiar species of interest; but owing to the sandy character of a great portion of the shores, the marine vegetation is as a whole very meagre. The keys of Florida are rich in species, many of which, as well as those of the gulf of Mexico, are also common to the Mediterranean. On the Pacific coast are found the gigantic *macrocystis*, with stems several hundred feet long, and other gigantic algæ, which make fields so dense and extended that navigators carefully avoid them. The partial study that our fresh-water algæ have received shows that this obscure vegetation is rich in interesting forms.—A marked feature of the vegetation of a large portion of our territory is the introduced plants, which are not only numerous as species, but as individuals; the climate being especially favorable to their development, many foreign plants appear to thrive better here than at home. The great majority of the agricultural weeds are of exotic origin; in some of the older states the meadows are white with oxeye daisy or yellow with foreign buttercups, while in Virginia they are blue with viper's bugloss (*echium*); the thistles, docks, purslane, crab grasses, and other pests of the farmer and gardener, are natives of other countries, as are also the stramoniums, hemlock, and other occupants of waste places around settlements. Many natural meadows are due to foreign grasses, and white clover is so generally introduced that farmers in the eastern states seldom sow it, being quite sure that, with a favorable soil, it will "come in." Two plants in the southern states afford remarkable instances of rapid naturalization. A few years ago a little prostrate composite (*acanthospermum*) appeared in the waste places, especially along the railroads, suddenly and completely carpeting the ground; it is a South American plant, the seeds of which were probably introduced with wool. The other is a little leguminous plant called Japan clover (*lespedeza striata*), which at the close of the civil war appeared all over the southern states. As cattle eat it, the introduction cannot be regarded as a misfortune; but this wide and sudden distribution of a Japanese species still remains a puzzle. Upon the Pacific coast, the most prominent introduced plants are mostly valuable ones; the wild oat (*avena fatua*), which covers such wide ranges to the exclusion of all other vegetation, is a European species; and bur clover (*medicago*) and alfilaria (*erodium*), which in certain seasons are the main reliance of stock growers, are both weeds introduced by the early Spanish settlers.—The zoölogy of the United States is essentially that of North America, nearly every species found on the North American continent having its habitat in some part of the states or territories. The *quadrumana*, embracing the entire monkey tribe and its congeners, are wanting. Of the *cheiroptera*, or bat tribe, there are 3 genera and 11 species (outside of Alaska, the fauna of which is not included in this description). Of the *carnivora*, the largest is the couguar or catamount, a formidable animal, inferior in strength and ferocity to the South American jaguar. There are 6 or 7 species of the fox. Of wolves there are the gray wolf of the wooded districts, of which there are several varieties, and the prairie wolf, the American representative of the jackal. To the *digitigrada* also belong the pine marten or American sable, the fisher, mink, weasel, skunk, and ermine. Among the *plantigrada* we have the black bear, the grisly bear, the largest and most formidable of American carnivora, and the California bear. The remaining members of the order found here are the badger, the wolverene or glutton, and the raccoon. Of the *pinnigrada*, the common seal occurs on the Atlantic coast, and the northern sea bear (*callorhinus ursinus*), which is taken in great numbers on the Pribyloff islands belonging to Alaska, occurs as far south as the mouth of the Columbia. The *ruminantia* are represented in considerable numbers. Among the *cervidæ* or deer family we have the moose and caribou, now confined to the N. E. states, and very scarce even there; the wapiti, incorrectly called the elk; and 5 or 6 species of deer. There is an antelope, the prong-horn, a native of the Rocky mountain region; and a representative of the sheep family, the bighorn or Rocky mountain sheep, found in the region of the Rocky mountains and Sierra Nevada. The bison, usually called the buffalo, is the only wild representative of the ox family. Of the amphibious mammals, a species of the manatee or sea cow frequents the shores of Florida and the gulf of Mexico. The porpoise and 5 or 6 species of the dolphin, among them the white whale, and the narwhal, are found along the coast; and the smaller species of whale are not uncommon, while the great sperm whale appears at some distance from the Pacific coast. The *insectivora* are represented by the mole, 3 genera and 7 or 8 species, and by 12 species of shrew. Among the *rodentia* are the beaver, porcupine, 10 or 12 squirrels proper, several flying squirrels, 4 or 5 prairie squirrels, 2 prairie dogs, and the gopher or pouched rat, of which there are several species; the woodchuck or American marmot; the muskrat; the rat tribe, of which 2 genera and 3 or more species are indigenous; the mouse tribe, of which there are 4 genera and about 20 species; the meadow mouse, of numerous species; the hare, of which there are 4 or 5; and the rabbit, of which there are at least 6 species. The *marsupialia* are represented by a single genus, the opossum. Of birds the genera and species are so numerous, that only the more prominent can be named. Of the order *raptores* (birds of prey), the eagle, of which 5 species have been ascertained to exist in the United States, takes the first place. Next follow the vultures, of which at least half a dozen species inhabit the United States, from the king vulture of California to the turkey buzzard and carrion crow; the hawks, of which there are not less than 25 ar 30 species, including the falcon, kite, hen hawk, goshawk, sparrow hawk, &c.; and the owls, of which there are at least 40 species. The *scansores* or climbers are represented by the Carolina parrot and the woodpeckers, a well known genus, of which there are many species. The order *insessores* is very numerous in the United States, and includes the song birds as well as those distinguished by their cry or sharp shrill note. The most common members of the order are the thrush tribe, including the bird here called robin, the mocking bird, and the cat bird; the warblers and flycatchers; the swallows, a numerous family; the finch tribe, which includes the sparrows; the kingfishers, the crow tribe, the orioles, the grakles, and the humming birds. The *rasores*, divided into the suborders *columbæ* and *gallinæ*, are numerously represented. Pigeons and doves of many species are found in vast numbers in the wooded portions of the western and northwestern states, and are not uncommon in any part of the Union. There are no true partridges in the United States, the partridge of the northern states being a grouse, and that of the southern states a quail; but the grouse, of at least a dozen species, quail, wild turkey, and several other species of gallinaceous birds, occur in great numbers. Of the *grallatores* or waders we have the flamingo, several herons, the ibis, the crane, the coot or mud hen, the rail, sandpiper, snipe, plover, &c. The *natatores* or swimmers are here a very numerous order. Of the *anserinæ* or geese there are about 20 species, including 2 species of swans; and of the *anatidæ* or duck family, at least 30. There are also 2 species of pelicans, a great number of species of gulls, and half a dozen cormorants. In reptiles the United States are less prolific than some other countries. There is a considerable variety of tortoises, though few of great size; and the keys or small coral islets along the coast of Florida, and the sandy spits along the shores of the southern Atlantic and gulf states, are frequented by the green and other sea turtles in great numbers. The alligator inhabits the rivers and bayous of the gulf states. The saurians are abundant, especially in the southern states, and include a great variety of lizards, skinks, horned frogs, monitors, &c. The ophidians or serpents are numerous, but only the rattlesnakes, the moccason snakes, and the vipers are venomous. The black snake is the only large constrictor in the United States. The batrachians embrace numerous species of frogs, tree frogs, 2 or 3 species of toad, the menobranchus, siren, 3 or 4 tritons or newts, and about 20 species of salamander. The number of genera and species of fish visiting or inhabiting the waters of the United States is too great to be enumerated. The most remarkable of the spine-finned are the perch, mackerel, sword fish, and mullet. Among those with soft abdominal fins, the best known are the salmon, shad, menhaden, alewife, herring, pike, and carp; of those with soft fins at the throat, cod, flounders, flat fish, &c.; and of fish without ventral fins, several species of eels, both fresh and salt water fish, and the lamprey. The shark, of which there are 16 or 18 species, and the ray or skate, of which there are 30 or 40, are the most formidable on the American coasts. Other fish well known and highly prized for the table are the halibut, tautog, blue fish, sea and striped bass, tomcod, porgy, perch, roach, dace, brook trout, lake trout, giant pike or muscalonge, and the delicious white fish of the lakes. Of mollusks, the *acephala* are widely distributed on the sea coast and through the lakes and rivers. The oyster of numerous varieties attains a flavor and excellence unknown elsewhere. The pearl oyster has been found on the California coast, and several of the *unionidæ* secrete pearls of considerable value. The soft-shelled clam (*mya arenaria*) and the quahaug or round clam (*Venus mercenaria*) are also much prized in some districts as articles of food. The pecten or scollop and the mussel are also edible species of bivalves. Others of the order are the cockle, hammer shell, razor shell, club shell, waterpot shell, and *teredo* or ship worm; and in the rivers the numerous species of *unio* and *anodonta*, usually called fresh-water clams, are abundant. There are many genera and species of land snails and slugs, and many species of fresh-water and marine *gasteropoda;* and the Atlantic, Pacific, and gulf of Mexico wash upon our shores great numbers of the cephalopods which inhabit their waters, among them the squid. The *crustacea* are numerous, and many of them edible. Crabs, lobsters, shrimps, horseshoes or king crabs, &c., abound on the coast; and the crawfish and land crab are found in the interior. Of the *arachnida* there are in the gulf states some venomous species, as the scorpion and several species of spider; but for the most part the spiders, mites, &c., of the United States are harmless. The centipede, though properly belonging to the tropics, is occasionally found in the southwestern states. The insect tribes are too numerous to receive more than a passing notice. The beetles are very abundant, and include many genera. There are several species of locust, some of them as destructive to vegetation as the locust of oriental countries. The bee, wasp, hornet, and humblebee, each of numerous species; the vast tribe of butterflies; the whole family of flies, including a blistering fly nearly equal to the Spanish; and the other insect orders, all have their representatives; and as we approach the tropics their number and variety greatly increase.—The population of the country prior to the first census, according to Bancroft, was as follows:

YEARS.	White.	Colored.	Total.
1688	....	......	200,000
1714	375,750	58.850	434.600
1727	502,000	78.000	580,000
1750	1,040,000	220,000	1,260,000
1754	1,165,000	260,000	1,425,000
1760	1,385,000	310,000	1,695,000
1770	1,850,000	462,000	2,312,000
1774	2,100,000	500,000	2,600,000
1780	2,383,000	562,000	2,945,000

The population as reported by the decennial censuses has been as follows:

YEARS.	White.	Colored.	Free colored.	Slave.	Aggregate.
1790....	3,172,006	757,208	59,527	697,681	3,929,214
1800....	4,306,446	1,002,037	108,435	893,602	5,308,483
1810....	5,862,073	1,377,808	186,446	1,191,362	7,239,881
1820....	7,862,166	1,771,656	233,634	1,538,022	9,633,822
1830....	10,537,378	2,328,642	319,599	2,009,043	12,866,020
1840....	14,195,805	2,873,648	386,293	2,487,355	17,069,453
1850....	19,553,068	3,638,808	434,495	3,204,313	23,191,876
1860....	26,922,537	4,441,830	488,070	3,953,760	31,443,321
1870....	33,589,377	4,880,009	4,880,009	....	38,558,371

Included in the aggregate for 1860 were 44,021 Indians and 34,993 Chinese, and in that for 1870, 25,731 Indians out of tribal relations, 63,199 Chinese, and 55 Japanese. The number of Indians sustaining tribal relations in 1870 was estimated at 357,981. In 1875 the number was reported by the commissioner of Indian affairs at 279,337, exclusive of 11,650 in Alaska; land reserved for Indians, 165,729,714 acres; number of agencies, 82. The representative population, excluding Indians not taxed and the inhabitants of the territories, was 38,115,641. The average increase in the aggregate population since 1870, in the 14 states that took censuses in 1875 and one in 1874, was over 15½ per cent.; at the same rate the population of the United States in 1875 would be about 44,590,000. The density of population in 1870 was 10·7 persons to the square mile, or, excluding the territories, 19·21. The total number of families in the United States was 7,579,363, having an average of 5·09 persons to each; the number of dwellings was 7,042,833, with an average of 5·47 persons to each. Of the total population in 1870, 32,991,142 were born in the United States and 5,567,229 in foreign countries. The number born of foreign parents was 9,734,845, and there were 1,157,170 persons of mixed (half native and half foreign) parentage, making 10,892,015 persons having one or both parents foreign. Only the nativity of those born in foreign countries is reported by the census. The distribution of the entire foreign element (10,892,015) into the chief nationalities has been computed as follows: Irish, 3,630,839; German, 3,307,205; British, 1,496,739; Scandinavian, 467,183; all others, 1,990,049. (See EMIGRATION.) The distribution of population by sex, nativity, and color, in 1860 and 1870, was as follows:

PARTICULARS.	1860.			1870.		
	Total.	Male.	Female.	Total.	Male.	Female.
Population....................	31,443,321	16,085,204	15,358,117	38,558,371	19,493,565	19,064,806
Native....................	27,304,624	13,856,313	13,448,311	32,991,142	16,486,622	16,504,520
Foreign....................	4,138,697	2,228,891	1,909,806	5,567,229	3,006,943	2,560,286
White....................	26,922,537	13,811,387	13,111,150	33,589,377	17,029,088	16,560,289
Native....................	22,860,805*	11,643,081	11,226,724	28,095,665	14,086,509	14,009,156
Foreign....................	4,131,686*	2,225,379	1,906,307	5,493,712	2,942,579	2,551,133
Colored....................	4,441,830	2,216,744	2,225,086	4,880,009	2,393,263	2,486,746
Blacks....................	3,853,467	1,936,536	1,916,931	4,295,960	2,115,380	2,180,580
Mulattoes....................	588,363	280,208	308,155	584,049	277,896	306,153
Chinese and Japanese.........	34,933	33,149	1,784	63,254	58,680	4,574
Indians....................	44,021	23,924	20,097	25,731	12,534	13,197

The number of males and females of school age, of males of the military and voting ages, with the distinctions of general nativity and race, and of male citizens of the voting age, was as follows in 1870:

PARTICULARS.	Total.	Male.	Female.
From 5 to 18 years of age.....	12,055,443	6,086,872	5,968,571
Native....................	11,509,126	5,811,730	5,697,396
Foreign....................	546,317	275,142	271,175
White....................	10,422,564	5,264,635	5,157,929
Colored....................	1,620,978	814,576	806,402
Chinese....................	4,143	3,666	477
Indians....................	7,758	3,995	3,763
Males 18 to 45 years of age....	7,570,487	....	....
Native....................	5,697,085	....	....
Foreign....................	1,873,402	....	....
White....................	6,655,811	....	....
Colored....................	861.164	....	....
Chinese....................	48,666	....	....
Indians....................	4,846	....	....
Males 21 yrs. of age and upward.	9,439,206	....	....
Native....................	6,896,623	....	....
Foreign....................	2,542,583	....	....
White....................	8,353,719	....	....
Colored....................	1,032.475	....	....
Chinese....................	47,531	....	....
Indians....................	5,481	....	....
Male citizens 21 years of age and upward..................	8,425,941	....	....

The total population 10 years of age and over was 28,228,945, of whom 14,258,866 were males and 13,970,079 females. There were engaged in all occupations 12,505,923, of whom 10,669,635 were males and 1,836,288 females, and 739,164 were from 10 to 15 years of age; in agriculture, 5,922,471 (5,525,503 males and 396,968 females), including 2,885,996 laborers and 2,977,711 farmers and planters; in professional and personal services, 2,684,793 (1,618,121 males and 1,066,672 females), including 2,053 actors, 43,874 clergymen, 975,734 domestic servants, 5,286 journalists, 1,031,666 laborers not specified, 40,736 lawyers, 62,383 physicians and surgeons, and 126,822 teachers not specified; in trade and transportation, 1,191,238 (1,172,540 males and 18,698 females); and in manufactures and mechanical and mining industries, 2,707,421 (2,353,471 males and 353,950 females), including, besides 41,619 mill and factory operatives not specified, 111,606 cotton and 58,836 woollen mill operatives, and 152,107 miners. The total number of blind was 20,320; deaf and dumb, 16,205; insane, 37,432; idiotic, 24,527. The total deaths from all causes during the year ended May 31, 1870, as reported by the census, were 492,263, being

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* Including civilized Indians.

1·28 per cent. of the entire population, excluding the territories. The highest rates of mortality were 2 per cent. in Louisiana and 1·77 in Massachusetts; lowest, 0·69 in Oregon, 0·80 in Minnesota, and 0·81 in Iowa. The total number of births during the year, and living on May 31, was 1,100,475. Of the total number of deaths, 188,684 were from general diseases, of which 94,832 were chiefly acute and 93,852 chiefly chronic. Under general diseases are classed those affections which involve a great number of diverse organs, or the whole frame, rather than any special part of it, the most important being fevers and consumption. Under local diseases were classed 60,455 deaths from those of the nervous, 17,034 of the circulatory, 63,971 of the respiratory, and 73,999 of the digestive system, 4,744 of the urinary system and male organs of generation, and 1,318 of the female organs of generation; 4,810 from affections connected with pregnancy; 2,187 from diseases of the organs of locomotion, and 2,778 of the integumentary system. Besides these, there were 28,493 deaths from conditions not necessarily associated with general or local diseases, 2,351 from poisons, 1,069 from worms, 364 from malformations, 22,740 from accidents and injuries, and 17,266 from unknown causes. The number of deaths from certain principal diseases, with their ratio to the total number from all causes, was as follows:

DISEASES.	Number of deaths.	Deaths from all causes to one from disease specified.
Cholera infantum	20,255	24·3
Consumption	69,896	7·0
Croup	10,692	46·0
Whooping cough	9,008	54·6
Measles	9,237	53·3
Pneumonia	40,012	12·3
Smallpox	4.507	109·2
Diphtheria	6,303	18·5
Scarlet fever	20.320	
Intermittent fever	7,142	43·1
Remittent fever	4,281	
Cancer	6,224	79·1
Cerebro-spinal fever	651	20·0
Enteric fever	22,187	
Typhus fever	1,170	
Diarrhœa	14,195	15·8
Dysentery	7,912	
Enteritis	9,046	

The highest death rate for consumption was in the New England states; the lowest in the southern and western states, and especially the territories. Intermittent and remittent fevers were most destructive in the southern states, and least in New England.—The agricultural resources of the United States, though but partially developed, contribute largely to its wealth and political importance. Of the 12,505,923 persons engaged in all occupations in 1870, 5,922,471 were employed in agriculture, including 2,977,711 farmers and planters and 2,885,996 laborers. The exports of agricultural produce form the most important feature of the commerce of the country; in 1874 they amounted to more than $700,000,000 in value. The exports of breadstuffs were valued at $161,198,864, including wheat worth $101,421,459, wheat flour $29,258,094, and Indian corn $24,769,951; of provisions, $78,328,990, including bacon and hams valued at $33,383,908, cheese $11,898,995, preserved meats $19,308,019, and pork $5,808,712; of cotton, $211,223,580; and of leaf tobacco, $30,399,181. The following are the most important statistics of agriculture, as reported by the censuses of 1860 and 1870:

PARTICULARS.	1860.	1870.
Land in farms, acres	407,212,538	407,735,041
" " improved	163,110,720	188.921,099
" " woodland	244,101,818	159,310,177
" " other unimproved		59,503,765
Percentage of unimproved to total	59·9	53·7
Number of farms	2,044,077	2,659,985
Average size, acres	199	153
Cash value of farms	$6,645,045,007	$9,262,803,861
" " of farming implements and machinery	$246,118,141	$336,878,429
Total amount of wages paid during the year, including value of board	....	$310,286,285
Total estimated value of all farm productions, including betterments and additions to stock	....	$2.447,538.658
Produce of orchards, value	$19,991,885	$47,335,189
" of market gardens	$16,159,498	$20,719,229
" of forests	....	$36,808,277
Home manufactures	$24,546,876	$23,423,332
Animals slaughtered or sold for slaughter	$213,618,692	$398,956,376
All live stock	$1,089,329,915	$1,525,276,457
Horses on farms, number	6,249.174	7,145,870
" not on farms	1,185,514	1,547.870
Mules and asses	1,151,148	1,125,415
Milch cows	8,585,735	8,935.332
Working oxen	2,254,911	1,319,271
Other cattle	14.779.373	13,566,005
Neat cattle not on farms	3,347,009	4,273,973
Sheep	22,471,275	28,477,951
Swine	33,512,867	25,134,569
Wheat, bushels	173,104,924	287,745,626
" spring	....	112,549,733
" winter	....	175,195,893
Rye	21,101,380	16,918,795
Indian corn	838,792,742	760.944,549
Oats	172,643,185	282,107,157
Barley	15,825,898	29,761.305
Buckwheat	17,571,818	9,821,721
Rice, lbs	187,167,032	73,635,021
Tobacco	434,209,461	262,735,341
Cotton, bales	5,387,052	3,011,996
Wool, lbs	60,264,913	100,102,387
Peas and beans, bushels	15,061,995	5.746,027
Potatoes, Irish	111,148,867	143,337,473
" sweet	42,095,026	21,709,824
Wine, gallons	1,627,192	3,092.330
Butter, lbs	459,681,372	514.092,683
Cheese (on farms)	103,663,927	53,492,153
Milk sold, gallons	....	235,500,599
Hay, tons	19,083,896	27,316.048
Seed, clover, bushels	956,188	639,657
" grass	900,040	583,188
Hops, lbs	10,991,996	25,456,669
Hemp, tons	74,493	12,746
Flax, lbs	4,720,145	27,133,034
Flaxseed, bushels	566,867	1,730,444
Silk cocoons, lbs	11,944	3,937
Sugar, cane, hhds	230,982	87,043
" sorghum	....	24
" maple, lbs	40,120,205	28,443.645
Molasses, cane, gallons	14,963.996	6,593,323
" sorghum	6,749.123	16,050,089
" maple	1,597,589	921,057
Wax, lbs	1,322.787	631,129
Honey	23,366,357	14,702,815

The leading crops in 1874, as reported by the department of agriculture, were as follows:

PRODUCTS.	Number of bushels, &c.	Number of acres.	Value.	Average yield per acre.
Ind. corn, bush.	850,148,500	41,036,918	$550,043,080	20·7
Wheat........	309,102,700	24,967,027	291.107,895	12·3
Rye..........	14,990,900	1,116,716	12,870,411	13·4
Oats..........	240,369,000	10,897,412	125,047,530	22·0
Barley........	32,552,500	1,580,626	29,983,769	20·6
Buckwheat...	8,016,600	452,590	6,477,885	17·7
Potatoes......	105,981,000	1,310,041	71,823,330	80·9
Total.......	1,561,161.200	81,361,330	$1,087.353,900	......
Tobacco, lbs..	178,355,000	281,662	$23,362,765	632·2
Hay, tons.....	24,133,900	21,769,772	331,420,738	1·11
Cotton, bales..	3,800,000	....	256,215,000	......

The number and value of farm animals in 1874 were as follows:

ANIMALS.	Number.	Average price.	Value.
Horses.................	9,504.200	$68 01	$646,370,939
Mules	1,393,750	80 00	111,502,713
Milch cows.............	10,906,800	28 52	311,039,824
Oxen and other cattle...	16,313,400	18 68	304,858,859
Sheep..................	33,783,600	2 79	94,320,652
Swine..................	28,062,200	5 34	149,860,234

The states producing the most wheat in 1873 were: Iowa, 34,600,000 bushels; Illinois, 28,417,000; Minnesota, 28,056,000; Wisconsin, 26,322,000; California, 21,504,000; Indiana, 20,832,000; Ohio, 18,567,000; Pennsylvania, 15,548,000; Michigan, 14,214,000; Missouri, 11,927,000; Tennessee, 7,414,000; Kentucky, 7,225,000; New York, 7,047,000. Indian corn: Illinois, 143,634,000; Iowa, 105,200,000; Ohio, 88,422,000; Missouri, 70.846,000; Indiana, 67,840,000; Kentucky, 58,451,000. Oats: Illinois, 35,360,000; Pennsylvania, 31,229,000; New York, 27,548,000; Ohio, 23,090,000; Iowa, 21,130,000; Wisconsin, 18,862,000; Missouri, 15,670,000. Rye: Pennsylvania, 3,283,000; Illinois, 2,078,000; New York, 1,853,000; Wisconsin, 1,240,000; Kentucky, 1,107,000. Barley: California, 10,213,991; New York, 5,876,000; Iowa, 4,500,000; Illinois, 2,280,000; Ohio, 1,576,000; Wisconsin, 1,515,000; Minnesota, 1,060,000. Buckwheat: New York, 2,947,000; Pennsylvania, 2,022,000. Tobacco: Kentucky, 152,000,000 lbs.; Virginia, 50,000,000; Ohio, 32,500,000; Tennessee, 23,750,000; Maryland, 19,300,000; Missouri, 13,200,000. Wool (census of 1870): Ohio, 20,539,643 lbs.; California, 11,391,743; New York, 10,599,225; Michigan, 8,726,145; Pennsylvania, 6,561,722; Illinois, 5,739,249; Indiana, 5,029,023; Wisconsin, 4,090,670. The chief cotton-producing states are Mississippi, Georgia, Alabama, Louisiana, Texas, Arkansas, South Carolina, Tennessee, North Carolina, and Florida. In 1874 the greatest number of horses was in Illinois, of mules in Tennessee, of oxen and other cattle in Texas and Illinois, of milch cows in New York, and of hogs in Iowa and Illinois. The wool product of 1873 was estimated at 146,000,000 lbs. The industry of wool growing, though progressing but little east of the Mississippi, has been increasing from the Missouri to the Pacific coast. The states reporting the largest number of sheep in 1874 were California, 4,683,200; Ohio, 4,639,000; Michigan, 3,486,300; New York, 2,037,200; Iowa, 1,732,600; Indiana, 1,722,500; Pennsylvania, 1,674,000; Missouri, 1,408,500; Illinois, 1,408,200; Texas, 1,338,700; and Wisconsin, 1,187,600.—The growth of manufactures is shown by the following statistics, reported by the censuses of 1850, 1860, and 1870:

PARTICULARS.	1850.	1860.	1870.
Number of establishments............	123,025	140,433	252.148
Steam engines, number............	....	....	40.191
" " horse power............	....	....	1,215.711
Water wheels, number............	....	....	51,018
" " horse power............	....	....	1,130,431
Hands employed, all............	957,059	1,311,246	2,053,996
" " males above 16............	731,137*	1,040.349*	1,615.598
" " females above 15............	225,922†	270,897†	823,770
" " youth............	....	....	114,628
Capital............	$533,245,351	$1.009,855,715	$2,118,208,769
Wages............	$236,755,464	$378,878,966	$775,584.343
Value of materials............	$555,123,822	$1,031,605,092	$2,488,427,242
" of products............	$1,019,106,616	$1,885,861,676	$4,232,325,442

The difference between the schedules used in 1870 and those of 1860 and 1850 renders the above statements only approximately valuable for purposes of comparison. Certain industries are included in the results of 1870 which are excluded from those of 1860; others reported in 1860 do not appear in the above totals for 1870. The marked increase in the value of products between 1860 and 1870 is especially noticeable. Making allowance for the differences above referred to, and estimating the increase due to special administrative efforts in 1870 at $250,000,000, the superintendent of the census computes that the value of products in 1870 should be reduced to $3,924,958,660, in order to be fairly comparable with that of 1860. This would show an increase of $2,039,096,984, or 108·12 per cent., 56 per cent. of which is attributed to the general advance in prices, leaving 52 per cent. as the actual increase of manufacturing production. In 1870 the leading industries were:

* Total males. † Total females.

INDUSTRIES.	Number of establishments, 1870.	Hands employed, 1870.	Capital.	Wages.	Value of Materials.	Value of Products.
Agricultural implements	2,076	25,249	$34,834,600	$12,151,504	$21,473,925	$52,066,875
Bagging, flax, hemp, and jute	83	3,170	3,158,101	958,106	2,624,682	4,507,664
Bags, paper	39	444	473,100	134,932	1,053,463	1,488,963
" other than paper	39	1,097	1,290,500	452,517	3,827,678	8,261,679
Belting and hose leather	91	808	2,118,577	454,187	3,231,204	4,558,043
Blacksmithing	26,364	52,982	15,977,992	9,246,549	13,228,907	41,828,296
Bleaching and dyeing (exclusive of straw goods)	250	4,172	5,006,950	1,783,449	53,166,634	58,571,493
Boats	174	2,381	1,665,193	1,225,996	1,214,016	3,300,775
Bookbinding	500	7,697	5,319,410	3,095,821	8,026,870	14,077,309
Boot and shoe findings	271	2,773	858,560	792,957	1,817,028	3,389,091
Boots and shoes	23,428	135,889	48,994,366	51,972,712	93,582,528	181,644,090
Boxes, wooden packing	489	4,509	3,571,942	1,909,088	4,236,745	8,222,483
" paper	234	4,486	1,148,025	1,222,338	1,553,777	3.917,159
Brass founding and finishing	275	3,377	4,783,585	1,731,306	3,293,629	6,855,756
" rolled	11	448	562,800	233,484	704,870	1,254,966
" ware	80	757	1,243,450	386.008	907,908	1,849,018
Bread, crackers, and other bakery products	3,550	14,126	10,025,966	5,553,184	22,211,856	36,907,704
Brick	3,114	43,293	20,504,238	10,768,853	7,413,097	29,028,859
Bridge building	64	2,090	2,973,250	1,123,353	3,239,771	5,476,175
Brooms and whisk brushes	635	5.206	2,015,602	1,268,875	3,672,837	6.622,285
Brushes, not whisk	157	2,425	1,683,993	691,405	1,312,897	2,694,823
Butchering	509	1,881	2,099.905	546,346	11,039,928	13.686,061
Carpentering and building	17,142	67,864	25,110,428	29,169,588	63,943,115	132.901,432
Carpets, rag	474	1,016	310.744	141,148	498,595	1,005,327
" other than rag	215	12,098	12,540,750	4,681,718	13,577,993	21,761,573
Carriages and wagons	11,847	54,928	36,563,095	21,272,730	22,787,341	65,362,837
Cars, railroad, and repairs	170	15,931	16,632,792	9,659,992	18,117.707	31,070,734
Cement	45	1,632	1,521,500	631,993	773,192	2,033,893
Charcoal and coke	167	3,473	2,393,083	1,294,707	1,204,779	3,161,104
Cheese	1,313	4,607	3.690,075	706,566	14,089,284	16,771,665
Chromos and lithographs	91	1,309	1,533,725	837,732	735.810	2,515,684
Clocks	26	1,330	882,700	805,340	818,409	2.509,643
Clothing, men's	7,838	106,679	49,891,080	30,535,879	86,117,231	147,650,378
" women's	1,847	11,696	3,520,218	2,513,956	6,837,978	12,900,583
Coal oil, refined	170	1,870	6,770,383	1,184,559	21,450.189	26,942,287
Confectionery	949	5.825	4,995,293	2,091.826	8,703,560	15,992,643
Cooperage	4,961	23,314	9,798,847	7,819,813	12,831,796	26,863,734
Copper, milled and smelted	27	1,082	3,158,500	577,129	10,715,400	11,684,123
" rolled	7	266	1,608,750	183,875	1,777,585	2.390.460
Cordage and twine	201	3,698	8,530,470	1,234,272	5.739.608	8,979,382
Cotton goods, not specified	819	129,442	133,238,797	37,280,856	106,307,962	168,457,353
" batting and wadding	27	244	276.800	78,876	533.451	720,117
" thread, twine, and yarns	123	6,077	7,392,295	1,743,651	5,135,303	8,726,217
Cutlery	82	2,111	2,246,830	973,854	762,029	2,882,803
" and edge tools, not specified	102	2,317	1,880,717	1,157,904	862,014	2,739,998
Drugs and chemicals	292	4,729	12,750,800	2,141,238	11,681,405	19,417,194
Dye woods, stuffs, and extracts	19	548	1,227,500	800,755	1,275,434	2,053,300
Edge tools and axes	97	3,520	4,219,205	1,997,795	2,413,555	5,482,539
Envelopes	22	910	875,000	316,158	1,288,139	2,277,541
Fertilizers (not ground plaster)	126	2,501	4.395,948	766,712	3,808,025	5.815,118
Firearms	46	3.297	4,016,902	2,490,774	1,100,999	5,582,258
Flax and linen goods	10	1,746	2,325,250	424,946	1,121,467	2,178,775
Flouring and grist-mill products	22,573	58,448	151,565,376	14,577,533	367,392,122	444,985,143
Fruits and vegetables, canned and preserved	97	5,869	2,335,925	771,643	3,094,846	5,425,677
Furniture, not specified	5.452	40,836	36,304,029	18,051,591	21,873,427	58,521,580
" chairs	529	12,462	7,643.884	3,522.940	8,979,745	10,567,104
Furs, dressed	182	2,903	3,472,267	1,042,305	4,816,122	8,903,052
Glass, window	35	2,859	3,244,560	1,503,277	1,400,760	3.811,308
" other	166	12,963	10,867,082	6,341,148	4,734,408	15.334,554
Gloves and mittens	221	4,058	2,340,550	980,549	1,884,146	3,998,521
Grease and tallow	62	442	841,980	184,787	5,114,868	6,035,845
Gunpowder	33	939	4,060.400	570.279	2,270,747	4.011,839
Hardware	580	14.236	13,869,315	6,845,640	9,188,064	22.237,829
" for saddlery	155	2,566	1,482,225	1,062,059	1,257.947	3,227,123
Hat materials	62	1,014	1,168,635	537,287	2,074,959	3,225,763
Hats and caps	483	16,173	6,489,571	6,574,490	12,262,407	24.848,167
Heating apparatus	59	1,141	1,605,830	853,516	1,424.345	3,425,150
Hoop skirts and corsets	194	4,345	1,707,600	1,045,188	2,276,577	4,758,290
Hosiery	248	14,788	10,931,260	4,429,085	9,835,823	18.411,564
Hubs, spokes, bows, shafts, wheels, and felloes	302	3,721	4,050.609	1,544.896	2,204,713	5,285.157
India-rubber and elastic goods	56	6,025	7,486,600	2,559,877	7,434,742	14,566.374
Iron, pigs	386	27,554	56,145,326	12,475,250	45,498,017	69,640,498
" castings, not specified	2,328	37,980	47,745.241	20,679,793	39.178,481	76,458,553
" " stoves, heaters, and hollow ware	326	13,325	19,833,720	8,156,121	9,044,069	23.389,665
" blooms	82	2,902	4,506,733	1,195,964	5,685,466	7,647,054
" forged and rolled	396	47,891	59,119,094	27,002,829	83,834,268	128,062,027
" anchors and cable chains	18	359	276,480	165,582	353,824	684,200
" bolts, nuts, washers, and rivets	93	4,423	4,263,227	1,665,426	4,021,070	7,191,151
" nails and spikes, cut and wrought	142	7.770	9,091,912	3.961,172	18,792.383	24,823,996
" pipe, wrought	22	2,129	5,311,095	1,155,910	4,872,907	7,369,194
" railing, "	74	630	405,200	821,101	533,116	1,268,756
" ship building and marine engines	1	352	750,000	210,000	187,000	472,000
Jewelry	710	10,274	11,867,856	4,498,348	9,252,425	22,821,029
Lead, bar and sheet	5	39	246,000	23,500	693,789	747,700
" pigs	62	589	2,191,600	237,628	2,807,074	3,499,183
" pipe	17	100	2,054,500	115.020	9,303.869	12,861,959
" shot	7	55	330,000	32,755	988.189	1,218,854
Leather, tanned	4,237	20,784	42,720,505	7,934,416	63,069,491	86,170,888

INDUSTRIES.	Number of establishments, 1870.	Hands employed, 1870.	Capital.	Wages.	Value of Materials.	Value of products.
Leather, curried	3,083	10,027	$12,303,785	$4,154,114	$43,565,593	$54,191,167
" morocco, tanned and curried	113	3,006	3,854,072	1,678,226	6,623,066	9,997,460
" patent and enamelled	26	528	906,000	341,445	3,211,749	4,018,115
" dressed skins	110	898	1,340,450	897,574	2,099,735	2,859,972
Lime	1,001	6,450	5,344,154	1,936,158	4,458,542	8,917,405
Liquors, distilled	719	5,131	15,545,116	2,019,810	19,729,432	36,191,133
" malt	1,972	12,443	48,779,435	6,758,602	28,177,684	55,706,643
" vinous	398	1,486	2,334 394	230,650	1,203,172	2,225,238
Looking-glass and picture frames	320	3,587	2,590,020	1,623,653	2,466,313	5,962,235
Lumber, planed	1,113	13,640	18,007,041	6,222.076	28,724,348	42,179,702
" sawed	25.817	149,871	143,399.082	39,966,817	103,102,393	209,852,527
Machinery, not specified	1,737	30,781	40,383,960	17,812,493	22,575,692	54,429,634
" cotton and woollen	338	8,918	10,603,424	4,632,913	5,246,874	13,311,118
" fire engines	9	838	986.000	307,414	913,833	1,636,580
" railroad repairing	150	20,015	23,222,761	12,541,818	11,952,840	27,565.650
" steam engines and boilers	663	22,962	25,987,452	12,572,244	19,734,404	41,576.264
Malt	208	1,640	8,017,248	700,624	9,002,094	12,016,515
Marble and stone work, not specified	923	13,190	11,287,677	7.601,471	8,034,858	21.316,860
" " " monuments and tombstones	1,049	5,719	4,942,063	2,490,296	3,709,518	8,916,654
Masonry, brick and stone	2,264	11,043	2,546,425	2,471,700	7,015,782	14,587,185
Matches	75	2,556	1,523,802	616,714	1,179,636	3,540,008
Meat, cured and packed, not specified	17	499	1,549,100	173.180	2.531,552	3,760,802
" packed, beef	36	435	496,700	111,595	1,524,680	1,950,306
" " pork	206	5,551	20,078,987	1,722,326	46.577,864	56,429,331
Millinery	1,668	7,205	2,425,926	1,156,531	3,365,132	6,513,222
Mineral and soda waters	337	2,383	3,462,360	923,703	1,687,931	4,222,278
Musical instruments, not specified	105	1,460	1,759,600	896,119	1,166,424	2,616,149
" " organs and materials	76	1,566	1,775,850	1,139,780	743,351	2,960,165
" " pianos and materials	156	4,141	6,019,311	3,071,392	2,924,777	8,329,594
Oil, animal	58	543	2,072,532	298,975	7,582,576	9,728,667
" fish	101	1,487	1,490.131	277,895	2,782.361	3.993,139
" cotton-seed	26	664	1,225,350	292.032	1,333,631	2.205,610
" linseed	77	945	3,862,956	458,387	7,216,414	8.881,962
Oil floor cloth	34	1,411	2,237,000	687,288	2,548,768	4,211,579
Paints, not specified	63	1,008	3,742.150	550.463	3,998,106	5,720,758
" lead and zinc	75	1,932	7,414,250	1,016,574	7,480,622	11,211,647
Paper, not specified	163	2,770	5.001,820	1.028,208	3,478.709	6,406,817
" printing	235	8,167	16.771,920	3,400,038	16,120,363	25,200,417
" wrapping	225	3,111	6,276,630	1,249.821	4,420.240	7,706,317
" writing	46	3,862	6,314.674	1,470.446	6,009,751	9,263,384
Paper hangings	15	869	1,415,500	329,267	1,315,106	2,165,510
Patent medicines and compounds	319	2,436	6,667,634	1,017,795	7,319,752	16,257,720
Plated ware	203	4.235	4,536,125	2,350,169	3,771.981	8,142,150
Printing cotton and woollen goods	42	8,894	13,367,553	3,438,089	43,373,358	54,446,044
Printing and publishing, not specified	311	10,663	16,839,993	7,156,332	11,398,131	28.995,214
" " " book	40	1,390	2.128,993	760,275	1,525.773	3,568.823
" " " newspaper	1,199	13,130	14,947,887	8,168,515	8,709.632	25,393,029
" " " job	609	5,555	6,007.354	2,710,234	2,966.709	8,511,934
Quartz, milled	296	2,973	10,910,822	2,460,631	12,446,974	18,386,406
Saddlery and harness	7,607	23,553	13,935,961	7,046,207	16,068,310	32,709,981
Salt	232	2,953	6,561,615	1.147,910	1,760,670	4,818,229
Sash, doors, and blinds	1,605	20,379	21,239,809	10,059,812	17,581,814	36.625,806
Saws	72	1,595	2,883,391	995,609	1,332,891	3,175,289
Scales and balances	49	1,003	1,019.500	668,451	920.870	2,823,816
Screws	18	1,582	9.147,880	664,408	1,248,135	3,425,473
Sewing machines	49	7,291	8.759,431	5,142,248	3,055.786	14,097,446
Ship building, ship materials, and repairs	762	11,063	9,102,335	5,594,686	8,252,394	17,910,328
Shovels and spades	13	849	757,100	489,100	1,424,944	2,445,526
Silk goods, not specified	53	4,176	4,019,630	1.328,389	4,126,821	7,066,487
Silk, sewing and twist	35	2,523	2,223,500	624,917	4,197,752	5,672.875
Silverware	55	815	1,282,550	542,113	1,222,428	2,344,357
Soap and candles	614	4,422	10,454,860	1,925,951	15,232,587	22.535,337
Starch	195	2,072	2,741.675	900,719	3.884.909	5,994,422
Steel, Bessemer	3	329	858,000	176,000	1,373.812	1,818,220
" cast	20	1,893	3,979.400	1,256,632	3.417,928	6,936,566
Steel springs	41	1,021	2,426,500	601,706	1,662.920	2,928,993
Stone and earthen ware	777	6,116	5,294,398	2,247,173	1,702,705	6,045,536
Sugar and molasses, raw cane	713	21,299	10,248,475	1,230,119	6,069,271	10,383,368
" " " refined cane	59	4.597	20,545.220	3,177.288	96,899,431	108,941,911
Tar and turpentine	227	2.638	902,225	476,284	2.146,090	3.585,225
Tin, copper, and sheet-iron ware	6,646	25,823	21,027,876	9,516,357	19,067,015	40,636,811
Tobacco and cigars	61	1,431	1,767,100	546,538	1,782.829	3,337,274
Tobacco, chewing and smoking, and snuff	512	20,368	11,788,714	4,670.095	20,351,607	36,258.177
" cigars	4,631	26,049	11,368,516	9,098,709	12,522,171	32,166,593
Trunks, valises, and satchels	222	3,479	2,185,694	1,810,798	3,315,038	7,725,488
Umbrellas and canes	83	2,618	1,737,757	837.580	1.926,056	4,098,032
Varnish	59	415	2,168,740	252,059	3,311,097	4,991,405
Watches	37	1,816	2,666,133	1,304,304	412.783	2,819,080
Wire	175	4,270	4,200,700	1,802,617	4,512,891	8,017,625
Wood, turned and carved	733	4,103	2,751,544	1,499,565	1,648,008	4,959,191
Wool-carding and cloth-dressing	1,001	2,318	1,740,249	260,419	3,504,052	4,675.926
Woollen goods	1,938	77,870	97,173,432	26,648,272	93.406,884	151,298,196
Worsted goods	102	12,920	10,085,778	4,368,857	14,308,198	22,090,331

Taking the value of products as a standard, the leading manufacturing states were: New York, $785,194,651; Pennsylvania, $711,894,344; Massachusetts, $553,912,568; Ohio, $269,-

713,610; Missouri, $206,213,429; Illinois, $205,620,672; New Jersey, $169,237,732; Connecticut, $161,065,474; Michigan, $118,394,676; Rhode Island, $111,418,354; and Indiana, $108,617,278. The great centre for the manufacture of boots and shoes, straw goods, cotton and woollen goods, and textiles in general, is in Massachusetts. The manufacture of iron (excepting castings), machinery, cast-steel springs, and glass ware is most extensively carried on in Pennsylvania; of leather, flour, sewing machines, and refined molasses and sugar, in New York; of silk goods, in New Jersey; of agricultural implements, in Ohio; and of clocks, India-rubber and elastic goods, and hardware, in Connecticut. The following statement affords a comparison between the values of leading products in 1870 and 1860:

INDUSTRIES.	VALUE OF PRODUCTS.	
	1860.	1870.
Agricultural implements	$17,487,960	$52.066,875
Boots and shoes	91,889,298	181.644,090
Brick and tile	11,263,147	29,302,016
Carpets other than rag	7,857,636	21,761,573
Clothing, men's	80,830,555	147,650,378
Hosiery	7,280,606	18,411,564
Cotton goods	115,681,774	177,489,739
Flouring and grist-mill products	248,580,365	444.985,143
India-rubber and elastic goods	5,768,450	14,566,374
Iron, blooms,	2,623,178	7.647,054
" pig	12,748,727	69.640,498
" rolled	31,868,705	120.314.158
" cast	36,132.083	99,843,218
" forged	2,030,718	8,385,669
Lead, pig	839,222	3,499,183
Liquors, distilled	26,768,225	36,191,133
" malt	21,310,933	55,706,643
Lumber, sawed	96,715,854	210,159,327
Machinery	51,887,266	138,519,246
Nails and tacks	9,857,223	23,101,082
Oil, vegetable	7,689,960	13,249,241
" animal (not fish)	2,568,336	9,728,667
Salt	2,289,504	4,818,229
Sewing machines	4,255,820	14,097,446
Soap and candles	18,464,574	22,535,337
Silk	6,607,771	12,739,362
Steel	1,778,240	9,609.986
Sugar and molasses (cane), refined.	42,241,834	108,941,911
Tar and turpentine	1,031,356	3,585,225
Tobacco, chewing and smoking, and snuff	21,820,535	38,388,359
Tobacco, cigars	9,068,778	33,373,685
Woollen goods	61,894.986	155,405,358
Worsted goods	3.701,378	22,090,331

The number of cotton (spinning) mills in the United States in 1875 was 875, having a total of 9,539,364 spindles; of these, 694 mills, with 9,057,543 spindles, were in northern, and 181 mills, with 481,821 spindles, in southern states. The quantity of cotton consumed during the year ending June 30 was 1,242,080 bales of 576,742,753 lbs., including 1,097,001 bales in northern and 145,079 in southern mills. The total number of spindles has increased from 7,114,000 in 1870 to 9,539,364 in 1875, the ratio of increase being larger in the southern than in the northern states. The consumption of cotton has increased from 930,736 bales in 1870 to 1,242,080 in 1875. For the production and manufacture of cotton in the United States, see Cotton, and Cotton Manufacture.—The statistics of mining in 1870 were as follows:

MINERALS.	No. of establishments.	Hands employed.	Amount of capital.	Value of products.
Asphaltum	1	23	$514,286	$450,000
Cinnabar	4	811	11,900,000	817,700
Coal, anthracite.	231	53,096	51,016,785	88,495,745
" bituminous	1,335	41,658	58,991,244	35,029,247
Copper	40	5,404	7,789,374	5,201,812
Gold, hydraulic mined	362	1,978	1,887,484	2,508,531
Gold, placer mined	1,632	8,463	5,624.549	7,266,613
Gold quartz	224	3,297	9,454,500	4.360,121
" and silver.	57	2.114	29,062,400	9,068,526
Iron ore	420	15.022	17,773,935	13,204,138
Lead	112	1,126	613,736	736,004
Marble	22	795	1,316,600	804,300
Nickel	1	48	60,000	24,000
Peat, cut	4	39	13,100	8.200
Petroleum	2,314	4.488	10,045.826	19,304,224
Silver quartz	102	1,056	4.015,000	3,248,861
Slate	101	1,749	2,738,239	1,311,492
Stone	997	12,573	7,152,854	9,971,100
Zinc	15	588	2,414,942	788,880
Total	7,974	154,328	$222,384,854	$152,598,994

Of the above named minerals, nearly one half in value were the product of Pennsylvania, which produced nearly all of the anthracite coal and of the petroleum, more than a third of the bituminous coal, and more than a fourth of the iron ore. The census returns of gold and silver were greatly below the actual production. The annual production of gold in the United States to 1873 and of silver to 1874 is given in the articles Gold, vol. viii., p. 81, and Silver, vol. xv., p. 57. The production of gold in 1874 amounted to about $42,000,000, and that of silver in 1875 to about $40,000,000. The production of pig iron in the United States has increased from 784,178 tons in 1855 to 919,770 in 1860, 931,582 in 1865, 1,865,000 in 1870, 2,854,558 in 1872, 2,868,278 in 1873, and 2,689,413 in 1874. About one fourth of the total amount is smelted from Lake Superior ores. The production of Bessemer steel has increased from 3,000 tons in 1867 to 40,000 in 1870 and 176,579 in 1874; that of other steel from 15,262 tons in 1865 to 35,000 in 1870 and 47,481 in 1874. In 1875 there were 10 establishments producing Bessemer and 42 other steel. The latest statistics of the production of iron and steel in the United States, as reported by the American iron and steel association, are as follows:

PRODUCTS—NET TONS.	1872.	1873.	1874.
Pig iron	2,854,558	2,868,278	2,689,413
All rolled iron, including nails	1,941,992	1,966,445	1,839,560
All rolled iron, including nails and excluding rails	941,992	1,076,368	1,110,147
Rails of all kinds	1,000,000	890,077	729,413
Bessemer steel rails	94.070	129,015	144,944
Iron and all other rails	905.930	761,062	584.469
Street rails	15,000	9,430	6.739
Kegs of cut nails and spikes	4,065,322	4,024,704	4,912,180
Merchantable Bessemer steel other than rails	16,430	27,985	31,635
Total of merchantable Bessemer steel	110,500	157,000	176,579
Crucible cast steel	27.260	32,786	34.128
Open-hearth steel	3.000	3.500	7,000
All other steel	7,740	13.714	6,853
Blooms from ore and pig iron	58,000	62,564	61,670

—The recent growth of the foreign commerce of the country is shown in the following statement of the gross specie value of imports and exports for years ending June 30:

YEARS.	IMPORTS.			EXPORTS OF FOREIGN PRODUCTS.			EXPORTS OF DOMESTIC PRODUCTS.			
	Merchandise.	Coin and bullion.	Total.	Merchandise.	Coin and bullion.	Total.	Merchandise.	Coin and bullion.	Total.	Mixed values, gold and curr'cy.
1850.......	173,509,526	4,628.792	178,138,318	9,475,493	5,476,315	14,951,808	134,900,233	2,046,679	136,946,912	....
1851.......	210,771,429	5,453,503	216,224,932	10,295,121	11,403,172	21,698,293	178,620,138	18,069,580	196,689,718	....
1852.......	207,440,398	5,505,044	212,945,442	12,053,084	5,236,298	17,289,382	154,931,147	37,437,837	192,368,984	....
1853.......	263,777,265	4,201,382	267,978 647	13,620,120	3,938,340	17,558,460	189.869,162	23,548,535	213,417,697	....
1854.......	297,623,039	6,939,342	304,562,381	21,631,260	3,218,934	24,850,194	213,985,236	38,062,570	252,047,806	....
1855.......	257,808,708	3,659,812	261,468,520	26,158,368	2,289,925	28,448,293	192,751,135	53,957,418	246,708,553	....
1856.......	310,432,310	4,207,632	314,639,942	14,781,372	1,597,206	16,378,578	266,438,051	44,148,279	310,586,330	....
1857.......	348,428,342	12,461,799	360,890,141	14,917,047	9,058,570	23,975,617	278,906,713	60,078,352	338,985,065	....
1858.......	263,338,654	19,274,496	282,613,150	20,660,241	10,225,901	30,886,142	251.351,033	42,407,246	293,758,279	....
1859.......	331,333,341	7,434,789	338,768,130	14,509,971	6,385,106	20,895,077	278,392,080	57,502,305	335,894,385	....
1860.......	353,616,119	8,550,135	362,166,254	17,333.634	9,599,358	26,933,022	316,242,423	56,946,851	373,189,274	....
1861.......	289,310,542	46,339,611	335,650,153	14,654,217	5,991,210	20,645,427	204,899,616	23,799,870	228,699.486	....
1862.......	189,356,677	16,415,052	205,771,729	11,026,477	5,842,989	16,869,466	179,644 024	31,044,651	210,688,675	213,069.519
1863.......	243,335,815	9,584,105	252,919,920	17,960,535	8,163,049	26,123,584	186,003.912	55,993,562	241,997,474	305.884,998
1864.......	316,447,283	13,115.612	329.562,895	15,333,961	4.922,979	20,256,940	143,504.027	100,473,562	243,977,589	320,035,199
1865.......	238,745,580	9,810,072	248,555,652	29,089,055	8,025,102	32,114,157	136.940,248	64,618,124	201,558,372	323,743.187
1866.......	434,812,066	10,700,092	445,512.158	11,341,420	3,400,697	14,742,117	337,518,102	82,643,374	420,161,476	550.684.277
1867.......	395,763,100	22,070,475	417,833,575	14,719,332	5,892,176	20,611,508	277,641,893	54,976,196	332,618,089	438,577,312
1868.......	357.436,440	14,188.368	371,624,808	12.562,999	10,038,127	22.601,126	269,389,900	83,745,975	353,135,875	454.301,713
1869.......	417,506,379	19.807,876	437,314,255	10.951,000	14,222.414	25,173,414	275,166,697	42.915,966	318,082,663	413,961,115
1870.......	435,958,408	26,419,179	462,377,587	16,155,295	14,271,864	30,427,159	376,616,473	43,883.802	420,500,275	499,092.143
1871.......	520,223,684	21,270.024	541.493,708	14.421,270	14,038,629	28,459.899	428,398,908	84,403,359	512,802,267	562,518,651
1872.......	626,595,077	13,743,689	640,338,766	15,690,455	7,079,204	22,769,749	428,487,131	72,798,240	501,285.371	549,219.718
1873.......	642,136,210	21,480,937	663,617,147	17,446,483	10,703,028	28,149.511	505,033,439	73,905,546	578.938,985	649,132,563
1874.......	567,406,342	28,454.906	595,861,248	16,849,619	6,930,719	23,780,338	569,433.421	59,699,686	629.133.107	693,039,054
1875.......	533,005,436	20,900,717	553,906,153	14,158,611	8,275,013	22,433,624	499,284,100	83,857,129	583,141,229	643,094,767

To the total value of domestic exports in 1874 should be added $10,200,059 gold or $11,424,066 currency, and to the value of those in 1875, $15,596,524 gold, for merchandise which the Canadian reports show to have been exported from the United States, but which does not appear in the returns of this country. The average yearly value in gold of the imports and exports, from the formation of the government to 1850, was as follows:

YEARS.	Imports.	Exports of foreign products.	Exports of domestic products.
1789 to 1799..	$52,359,269	$15,175,257	$27,944,992
1799 " 1809..	93,351,628	37,827,500	37,287.530
1809 " 1819..	81,906,927	13,357,458	45,338,432
1819 " 1829..	80.220,651	23,326,438	52,832,653
1829 " 1839..	126,641,148	19,564,916	83,845,630
1839 " 1849..	119,678,698	13,233,998	110,840,752

The chief articles of import and of domestic export during the year ending June 30, 1875, with their values, were as follows:

IMPORTS.

Chemicals, drugs, dyes, and medicines..........	$10,272,571
Coffee..	50,591,488
Gold and silver, coin and bullion...............	20,900,717
Gums..	2,321,383
Hides and skins, other than fur.................	18,536,902
India-rubber and gutta-percha, crude and manufactures of..............................	5,189,469
Paper materials, rags and other.................	4,770.745
Silk, raw.......................................	4,504.306
Tea...	22,673,703
Animals, living.................................	2,861,002
Books, engravings, &c...........................	2,633,796
Barley..	6.297,738
Cotton manufactures.............................	27,738,401
Earthenware.....................................	4,265.210
Fancy goods.....................................	5.623,949
Flax and manufactures of........................	17.720.647
Fruits..	12.952,630
Furs and fur skins, dressed.....................	3,017,631
Glass and glass ware............................	5,805,115
Hemp and manufactures of........................	3,219,385
Iron and steel, and manufactures of.............	18,475,733
Jute and other grasses, and manufactures of....	$3,882,268
Leather and manufactures of.....................	10,245,597
Opium	2,037.793
Precious stones.................................	3,612.280
Seeds	6.687,192
Silk, manufactures of...........................	24,380,923
Soda and salts of...............................	5,563.526
Spices..	2,285 525
Straw and palm leaf, manufactures of............	2,325,539
Sugar, brown....................................	70,015,757
Molasses..	11,655,224
Melado..	3,313,597
Tin and manufactures of.........................	15,365,565
Tobacco and manufactures of.....................	6,861,384
Watches, clocks, &c.............................	2,566,195
Wines and spirits...............................	7,769,527
Wood, manufactures of...........................	6,182,988
Wool, unmanufactured............................	11,071,259
" manufactures of...............................	44,609,704
All other articles..............................	62,084,493
Total...	$552,918,857
Total merchandise, exclusive of specie......	$532,018,140

DOMESTIC EXPORTS.

Agricultural implements.........................	$2,625.372
Animals, living.................................	2.672,505
Indian corn.....................................	24,456,937
Wheat...	59,607,863
Wheat flour.....................................	23,712,440
Cotton, raw.....................................	190,638,625
" manufactured..................................	4,071.882
Chemicals. dyes, and medicines..................	2,925.322
Furs and fur skins	4.396.424
Gold and silver, coin and bullion...............	83.857,129
Hides and skins, other than fur.................	4,729.725
Iron and steel, and manufactures of.............	19,349.671
Leather and manufactures of.....................	7,324.796
Naval stores....................................	2,901,625
Oil cake..	5,138.300
Oils, mineral, refined or manufactured..........	30,078,568
Provisions......................................	81,343,401
Spirits of turpentine...........................	1.924,544
Sugar and molasses..............................	3,793.517
Tallow	5.692.203
Tobacco and manufactures of.....................	27,844,490
Wood " " "......................................	17.740,085
All other articles..............................	36,239,343
Total...	$643,064,767
Total merchandise, exclusive of specie......	$559,207,638

The chief countries represented in the foreign commerce in 1875 were as follows:

COUNTRIES.	Imports.*	Domestic exports.†
Argentine Republic	$5,834,709	$1,301,294
Belgium	6,189,098	12,387,590
Brazil	42,033,046	7,634,865
Central American states	2,627,359	1,042,784
Chili	789,242	2,062,190
China	13,480,440	1,465,934
France	63,342,631	50,133,711
French West Indies and Guiana	2,037,266	1,167,276
Germany	40,893,386	52,517,913
England	144,195,531	321,014,343
Scotland	11,615,139	17,457,991
Ireland	1,237,167	28,327,535
Nova Scotia, New Brunswick	3,896,350	7,724,820
Quebec, Ontario, &c	26,308,456	23,909,153
British Columbia	2,154,753	1,032,883
" West Indies and Honduras	4,642,891	7,587,218
" Guiana	2,499,245	1,830,807
" East Indies	15,584,099	473,049
" Hong Kong	1,206,816	7,296,070
" Australasia	3,755,590	3,505,345
Hayti	2,207,173	4,870,812
Italy	9,190,182	7,226,554
Japan	7,772,302	1,647,197
Mexico	11,634,983	3,895,792
Netherlands	2,353,658	7,483,010
Dutch East Indies	6,775,339	1,034,159
Peru	1,344,595	2,443,657
Portugal	480,362	2,820,099
Russia on the Baltic	698,221	10.420,706
Spain	4.534,873	7,540,086
Cuba	66,745,527	15.586,658
Porto Rico	6,930,082	2,377,757
All other Spanish possessions	6,830,187	89,889
Turkey in Europe	72,459	3,454,795
United States of Colombia	12,942,305	4,272,950
Uruguay	2,935,039	1,440,665
Venezuela	5,690,224	2,423,254
All other countries, islands, &c	10,445,378	14,193,956
Total	$553,906,153	$643,094,767

The total number of vessels entered in the foreign trade during the year ended June 30, 1875, was 27,961, with an aggregate tonnage of 11,692,810. Of these, 11,074, of 3,573,950 tons, were American, and 16,887, of 8,118,860 tons, were foreign; 1,028, of 1,141,734 tons, were American ocean steamers, and 1,246, of 3,142,723 tons, foreign ocean steamers. The total number cleared was 28,236, of 11,896,507 tons, including 11,216 American vessels, of 3,736,639 tons, and 17,020 foreign vessels, of 8,159,868 tons. Besides the above, 74,027 vessels, of 31,614,282 tons, entered, and 73,324, of 30,440,626 tons, cleared in the coastwise trade and fisheries. The extent of the merchant marine of the United States at different periods has been as follows:

YEARS.	Sail, tons.	Steam, tons.	Total, tons.
1790	478,377	....	478,377
1800	972,492	....	972,492
1810	1,424,783	....	1,424,783
1820	1,280,167	....	1,280,167
1830	1,127,304	64,472	1,191,776
1840	1,978,455	202,309	2,180,764
1850	3,010,020	525.434	3.535,454
1855	4,441,716	770.285	5.212,001
1860	4,485,931	867,937	5.353.868
1865‡	4,029,643	1,067.139	5,087.782
1870§	4.171,412	1.075.095	4,246,507
1875§	3,685,064	1,168,668	4,853,732

The distribution of the merchant marine has been as follows:

YEARS.	Foreign trade, tons.	Coastwise trade, tons.	Whale fisheries, tons.	Cod and mackerel fisheries, tons.
1790	846,254	103,775	....	28,348
1800	667,107	272,492	3.466	29,427
1810	981,019	405,347	3,589	34,828
1820	583,657	588,025	36,445	72.040
1830	537,563	516,979	39,705	97,529
1840	762,838	1,176,694	136,927	104,305
1850	1,439,694	1,797.825	146.017	151,918
1855	2,348,358	2,543,255	186,848	133.540
1860	2,379,396	2,644,867	166,841	162,764
1865	1,518,350	3,381.522	90,516	106,894
1870	1,448.846	2,638,247	67,954	91,460
1875	1,515,598	3,219,698	38,229	80,207

The classification of the merchant shipping of the United States in 1870 and 1875 was as follows:

CHARACTER.	Year ending June 30, 1870.		Year ending June 30, 1875.	
	Vessels.	Tons.	Vessels.	Tons.
Registered, permanent	1,932	1,093,649·69	2,030	1,125,898·32
Registered, temporary	1,010	423,150·37	951	427,929·60
Enrolled, perman'nt	21,150	2,584,792·81	23,379	3,108,440·86
Enrolled, temporary	375	93,147·81	534	129,948·68
Licensed under 20 tons	4,531	51,766·55	5,391	61,514·68
Total	28,998	4,246,507·23	32,285	4,853,732·14

Of those reported in 1875, 23,440, of 3,367,618·01 tons, were returned for the Atlantic and gulf coasts; 1,225, of 229,257·51 tons, for the Pacific coast; 5,496, of 837,891·76 tons, for the northern lakes; and 2,124, of 418,964·86 tons, for the western rivers. The number, class, and tonnage of vessels built in the United States for a series of years have been:

YEARS.	Ships and barks.	Brigs.	Schooners.	Sloops, canal boats, and barges.	Steamers.	Total.	Total tonnage.
1820	21	60	301	152	...	534	47,784
1830	25	56	403	116	37	637	58,694
1840	97	109	378	224	64	872	118.309
1850	247	117	547	290	259	1,360	272,218
1855	381	126	605	669	253	2,047	583.450
1860	110	36	372	289	264	1,071	212,892
1861	110	38	360	371	264	1,143	233,194
1862	62	17	207	397	183	864	175,076
1863	97	34	212	1,113	367	1,823	310,884
1864	112	45	322	1,389	498	2,366	415,741
1865	109	46	369	853	411	1,788	388,806
1866*	96	61	457	926	348	1,888	336,147
1868	80	48	590	848	236	1,802	285,305
1870	73	27	519	709	290	1,618	276,953
1872	15	10	426	900	292	1,643	209,052
1874	71	22	655	995	404	2,147	432,725
1875	114	22	502	340	323	1,301	297,639

On June 30, 1875, there were employed in the cod and mackerel fisheries 1,259 vessels of 68,703 tons, and in the whale fisheries 165 vessels of 38,229 tons. The products of the year ending on that date were valued at $15,588,581, including $2,841,002 whale and $10,747,579 other fisheries. (See Fisheries.) The number and chief nationalities of emigrants arriving in the United States each year to the close of 1873 are given in the article Emigration. For the years 1874 and 1875 they were:

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* Gold. † Mixed values.
‡ Partly old and partly new measurement.
§ New measurement.

* New measurements from 1866.

COUNTRIES.	1874.	1875.
England	43,396	30,040
Ireland	47,688	29,969
Scotland	8,765	5,739
Wales, Man, Jersey, and Channel islands	573	431
Total British isles	100,422	66,179
British America	30,596	23,420
Norway	6,581	4,465
Sweden	4,336	6,031
Denmark	3,188	1,951
Holland	1,533	1,073
Germany	56,927	36,565
Austria	6,891	6,039
Russia	7.447	4,369
France	8,741	8,607
Switzerland	2,436	1,641
Italy	5,787	3,315
All other countries	25,929	27,576
Total	260,814	191,231

The whole number of customs districts in the United States is 112, each having a port of entry. There are also 15 interior ports of delivery, at which duties may be collected on appraised merchandise transported in bond from exterior ports of entry, viz.: Albany, N. Y.; Pittsburgh, Pa.; Parkersburg and Wheeling, W. Va.; Cincinnati, O.; Evansville, Ind.; Cairo and Galena, Ill.; Burlington and Dubuque, Iowa; Omaha, Neb.; Louisville, Ky.; Memphis and Nashville, Tenn.; and St. Louis, Mo. Of these the following have also been made ports of entry, to which merchandise may be transported directly without prior appraisement: Cincinnati, O.; Evansville, Ind.; Louisville, Ky.; Memphis, Tenn.; Pittsburgh, Pa.; and St. Louis, Mo. The railroad, canal, telegraph, and postal systems of the United States are described in the special articles on those subjects.—The wealth, taxation (not national), and public debt (not national) in 1860 and 1870 were as follows:

PARTICULARS.	1860.	1870.
True value of real and personal estate	$16,159,616,068	$30,068.518,507
Assessed value of real estate	6,973,006,049	9,914,780,825
“ “ of personal estate	5,111,553,956	4,264,205,907
Assessed value, total	12,084,560,005	14,178,986,732
Taxation, state	....	68,051,298
“ county	....	77,746,115
“ town, city, &c.	....	134,794,108
“ total	94,186,746	280,591,521
Public debt, state, bonded	....	824,747,959
“ “ “ all other	....	28.118,739
“ “ county, bonded	....	157,955,880
“ “ “ all other	....	29,609,660
“ “ town, city, &c., bonded	....	271,119,668
Public debt, town, city, &c., all other	....	57,124,852
Public debt, aggregate	....	868,676,758

—The several states of the Union, so far as their internal affairs are concerned, are supreme and independent, while for the common interests of all they delegate a portion of their powers to a central government, whose laws, so long as they are not in conflict with the constitution, are paramount to state authority. All powers not expressly granted by the constitution to the federal government, nor prohibited by it to the states, are reserved to the states respectively or to the people. The government consists of three branches, the legislative, executive, and judicial. The executive power is vested in a president, who together with a vice president is elected for four years by a college of electors, each state returning as many electors as it is entitled to have senators and representatives in congress. The present total number of electors is 366. The constitution provides that they shall be appointed in such manner as the respective legislatures may direct. At first they were generally chosen by the legislatures themselves, and this continued to be done in South Carolina till 1860; but now they are designated in all the states by popular vote at an election held every four years (counting for this century from 1800), on the Tuesday next after the first Monday in November. The electors meet in each state on the first Wednesday in December and cast their votes for president and vice president. On the second Wednesday in February the certificates of the votes thus cast are opened by the president of the senate in presence of the two houses of congress, when the votes are counted and the result declared. The official term of the officers declared elected begins on the 4th of March following. In case of the removal, death, resignation, or inability of the president, the vice president succeeds to the presidency, and, if the disability be not temporary, serves the remainder of the presidential term; and in case of the failure of both president and vice president, congress has authority to declare what officer shall act as president until the disability be removed or a president shall be elected. By act of congress approved March 1, 1792, the president of the senate *pro tempore*, or in case there be no president of the senate, the speaker of the house of representatives, is to act as president in such a case, and a new president is to be elected if the vacancy occurs more than five months before the end of the existing presidential term. Neither the president of the senate nor the speaker of the house has ever succeeded to the presidency under this law. Three presidents have died in office and been succeeded by vice presidents, viz.: William Henry Harrison in 1841, succeeded by Vice President John Tyler; Zachary Taylor in 1850, succeeded by Millard Fillmore; and Abraham Lincoln in 1865, succeeded by Andrew Johnson. When there is no election of president by the people for want of a majority of electoral votes for any one candidate, the house of representatives chooses the president from the three having the highest number of votes, the body of representatives from each state casting a single vote. Two elections by the house have occurred, viz.: in 1801 (under the original provision of the constitution, which required that the candidate having the highest number of votes for president should be president and the candidate having the next highest number vice president), when, there being a tie between Thomas Jefferson and Aaron Burr, the former was chosen president by the house; and in 1825, when John Quincy Adams was chosen. When the election results in no choice for vice president, that officer is chosen by the senate from the two who have received the highest number of votes. In 1837 Richard M. Johnson was thus chosen vice president by the senate. The president may be removed from office on impeachment for and conviction of treason, bribery, or other high crimes and misdemeanors. He is commander-in-chief of the army and navy, and of the militia of the several states when they are called into the actual service of the general government; and has power, by and with the advice and consent of the senate, to make treaties, and to appoint ministers and other public officers of the United States whose appointment is not otherwise provided for. He receives a salary of $50,000 (until 1873, $25,000) a year, and the vice president $10,000. All acts of congress must be presented to him before they can become law, and he may within ten days from its presentation return any bill of which he disapproves to the house in which it originated, stating his objections. If on reconsideration the bill is again passed by two thirds of each house, it becomes law. The president and vice president must be native-born citizens, 35 years of age, and 14 years resident within the United States. The president is assisted by a cabinet of seven ministers, called the secretaries of state, of the treasury, of the interior, of war, and of the navy, the attorney general, and the postmaster general, who are nominated by him and confirmed by the senate. They receive $8,000 a year each. These are the heads of the seven executive departments of the government, viz., state, treasury, interior, war, navy, justice, and post office. There are two assistant secretaries in the department of state, two in that of war, two in the treasury, and one in the interior department. There are three assistant postmasters general, and three assistant attorneys general in addition to the solicitor general, who is the first assistant of the attorney general. These officers are also appointed by the president with the consent of the senate. The principal duties of the secretary of state relate to foreign affairs. Besides other matters relating more directly to finance, the secretary of the treasury superintends the collection of duties and internal revenue; he also has general supervision of the lighthouses of the United States. There are in the department of the treasury a treasurer, commissioner of customs, commissioner of internal revenue, and comptroller of the currency; also a bureau of statistics, which collects and publishes statistics relating to commerce and navigation; and a bureau of the mint, which has under its control all the mints and assay offices of the United States. The secretary of the interior is charged with the supervision of public business relating to: 1, the census; 2, public lands, including mines; 3, Indians; 4, pensions and bounty lands; 5, patents; 6, custody and distribution of publications; 7, education; 8, government hospitals for the insane; 9, Columbia asylum for the deaf and dumb; also certain duties relating to the territories. The most important of these functions are intrusted to the commissioner of the general land office, commissioner of Indian affairs, commissioner of pensions, commissioner and assistant commissioner of patents, superintendent of public documents, and commissioner of education, who are appointed by the president with the consent of the senate. The department of agriculture (which is not an executive department), under the charge of a commissioner of agriculture, is designed to obtain and diffuse useful information relating to agriculture, and to procure and distribute new and valuable seeds and plants. Annual reports are made to congress through the president by the chiefs of the departments above named. The general supervision of Indian affairs is vested in a board consisting of not more than ten commissioners, who are appointed solely by the president "from men eminent for intelligence and philanthropy," and who serve without pecuniary compensation. They are required to supervise all expenditures for the Indians, and to inspect all goods purchased for them. Inspectors, not exceeding five, are appointed by the president to visit the Indian superintendencies and agencies as often as twice a year and investigate their affairs. There are four superintendents of Indian affairs, who exercise a general supervision and control over the official acts of all persons employed by the government in that service. The national legislature consists of a congress composed of a senate and house of representatives. The senate consists of two senators from each state chosen by the respective legislatures for six years, in such a way that one third of the whole body goes out of office every two years. The act of congress of 1866 provides that in every state each branch of the legislature shall first vote separately and *viva voce* for senator. These votes are declared in joint assembly on the following day, and if no candidate has received a majority vote of each house, both houses in joint assembly elect a senator by ballot. If a vacancy occur in the senate when the legislature of the state interested is not in session, it may be filled by appointment of the governor until the legislature next meets, when a senator is chosen for the unexpired term. The vice president of the United States is president of the senate *ex officio*, and the senate elects a president *pro tempore* to serve in his absence; the vice president has only a casting vote. A senator must be 30 years of age, nine years a citizen of the United States, and at the time of his election resident within the state for which he is chosen. The senate has sole power to try all impeachments. The house of representatives is composed of members chosen for two years by the people of each state; they must be 25 years of age, seven years citizens of the United States, and at the time of their election resident within the states for which they are chosen. The number of representatives in congress is fixed by the law of 1872 at 292, and they are apportioned among the several states according to their representative population, excluding Indians not taxed. The number of representatives in congress and of electoral votes of each state are as follows:

STATES.	Represen-tatives.	Electoral votes.	STATES.	Represen-tatives.	Electoral votes.
Alabama.........	8	10	Nebraska..........	1	3
Arkansas........	4	6	Nevada..........	1	3
California........	4	6	New Hampshire....	3	5
Connecticut......	4	6	New Jersey........	7	9
Delaware........	1	3	New York.........	33	35
Florida..........	2	4	North Carolina.....	8	10
Georgia..........	9	11	Ohio..............	20	22
Illinois..........	19	21	Oregon...........	1	3
Indiana..........	13	15	Pennsylvania.......	27	29
Iowa............	9	11	Rhode Island.......	2	4
Kansas..........	3	5	South Carolina.....	5	7
Kentucky........	10	12	Tennessee.........	10	12
Louisiana........	6	8	Texas.............	6	8
Maine...........	5	7	Vermont..........	3	5
Maryland........	6	8	Virginia...........	9	11
Massachusetts....	11	13	West Virginia......	3	5
Michigan........	9	11	Wisconsin.........	8	10
Minnesota.......	3	5			
Mississippi.......	6	8	Total..........	292	366
Missouri.........	13	15			

The admission of Colorado as a state with one representative and two senators will add three to the total number of electoral votes. Every state is entitled to at least one representative. New states admitted after the apportionment (which is made after each decennial census) elect representatives in addition to the limited number of 292, but such excess continues only till the next apportionment. There are also delegates, one from each organized territory, who are entitled to speak in the house, but not to vote. The election for representatives and delegates to congress is held biennially on the Tuesday next after the first Monday of November in even years. The house of representatives chooses its own speaker and other officers; has the sole power of impeachment; and originates all bills relating to revenue. Members of both senate and house receive $5,000 a year, and mileage at the rate of 20 cents for each mile of travel in going to and returning from the seat of government. The pay of the speaker of the house is $8,000 a year. The regular sessions of congress begin on the first Monday of December in each year, and extra sessions may be called by the president whenever he deems it necessary. The term of office of representatives, and consequently the duration of each congress, expires by law on the 4th day of March of every odd year. Congress has power to lay and collect taxes, imposts, and excises, which must be uniform throughout the United States; to borrow money on the credit of the United States; to regulate commerce with foreign nations, among the several states, and with the Indian tribes; to coin money; to define and punish piracy and offences against the law of nations; to declare war; to raise and support an army and navy; to provide for calling forth the militia when required; and to exercise exclusive legislation over the District of Columbia. Congress can make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press, or the right of the people peaceably to assemble and to petition the government for a redress of grievances. It has passed general laws of bankruptcy and for the protection of inventions, copyrights, and trade marks. (See BANKRUPT, PATENTS, COPYRIGHT, and TRADE MARK.) The judiciary comprises a supreme court, circuit courts, district courts, and the court of claims. There are also the supreme court of the District of Columbia and the territorial courts, the judges of which are appointed by the president. The former has jurisdiction corresponding to that of the state courts and also that of the federal district courts; the jurisdiction of the latter is specially defined by the acts providing for their creation. Besides these, each state has its own independent judiciary. The supreme court consists of a chief justice (salary $10,500) and eight associate justices (salary $10,000 each). It holds one session annually in Washington, beginning on the second Monday in October. The United States is divided into nine judicial circuits, as follows: 1, Maine, New Hampshire, Massachusetts, and Rhode Island; 2, Vermont, Connecticut, and New York; 3, Pennsylvania, New Jersey, and Delaware; 4, Maryland, Virginia, West Virginia, North Carolina, and South Carolina; 5, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas; 6, Ohio, Michigan, Kentucky, and Tennessee; 7, Indiana, Illinois, and Wisconsin; 8, Nebraska, Minnesota, Iowa, Missouri, Kansas, and Arkansas; 9, California, Oregon, and Nevada. There is a circuit judge (salary $6,000) resident in each circuit, and a justice of the supreme court visits each circuit for the purpose of holding circuit court. Circuit courts are held by the justice of the supreme court assigned to the circuit, or by the circuit judge of the circuit, or by the district judge of the district, or by any two of them sitting together. The United States is also divided into 57 districts, in each of which there is a district court composed of one judge, who resides in the district for which he is appointed. In many states the district is coextensive with the state; in others the state is divided into two or three districts. The court of claims consists of a chief justice and four associate judges; its sessions are held in Washington. All the judges of the federal courts are appointed for life by the president with the consent of the senate; but they may be removed for cause. (For the jurisdiction of the federal courts, see COURT, vol. v., pp. 432–'3.) The qualifications of voters in the United States are prescribed by the states respectively; the fifteenth amendment to the federal constitution provides that the right of citizens to vote shall not be denied or abridged on account of race, color, or previous condition of servitude. The executive power of each organized territory is vested in a governor, who is appointed for four years by the president of the United States with the consent of the senate, and receives a salary of $3,000. The secretary is appointed in the same manner and for the same period, and receives a salary of $2,500. The legislative power is vested in a council and house of representatives, chosen by the people for two years; the sessions are biennial. A delegate to congress is elected by the people in each territory for two years. The legislation of the territories is subject to revision by congress. The judicial power is vested in a supreme court consisting of a chief and two associate justices, who are appointed for four years by the president with the consent of the senate, and receive a salary of $3,000 each; in three district courts each held by a judge of the supreme court; and in inferior courts organized by the territory. Territories are admitted as states into the Union by special acts of congress. The District of Columbia is under the exclusive jurisdiction of congress. By act of June 20, 1874, the government is vested in a commission of three persons appointed by the president with the consent of the senate. All ministers to foreign countries are appointed by the president and confirmed by the senate.—The constitution forbids the suspension of the writ of *habeas corpus*, unless when in cases of rebellion or invasion the public safety may require it; the passing of any bill of attainder or *ex post facto* law; the imposition of any capitation or other direct tax except in proportion to the census, or of any tax or duty on articles exported from any state; and the passing of any commercial or revenue regulation giving a preference to the ports of one state over those of another state. No money can be drawn from the treasury except in consequence of appropriations made by law, and a statement of the public receipts and expenditures must be published from time to time. No title of nobility can be granted by the United States, and no person holding any office of profit or trust under them can without the consent of congress accept of any present, emolument, office, or title of any kind from any king, prince, or foreign state. The right of the people to bear arms may not be infringed; soldiers may not be quartered in any house in time of peace without the consent of the owner, nor even in time of war except in a manner to be prescribed by law. The persons, houses, papers, and effects of the people are exempt from search and seizure except under a warrant issued upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched and the persons or things to be seized. No person may be held to answer for a capital or otherwise infamous crime unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia when in actual service in time of war or public danger; nor may any person be subject for the same offence to be twice put in jeopardy of life or limb; nor be compelled in any criminal case to be a witness against himself; nor be deprived of life, liberty, or property, without due process of law. In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial by an impartial jury of the state and district wherein the crime shall have been committed; to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor; and to have the assistance of counsel for his defence. Excessive bail may not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted. Private property may not be taken for public use without just compensation. No state can enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money, emit bills of credit, or make anything but gold and silver a legal tender for debts; pass any bill of attainder, *ex post facto* law, or law impairing the obligation of contracts; grant any title of nobility; or lay any imposts or duties on imports and exports, without the consent of congress, except what may be necessary for executing its inspection laws. The net produce of all imposts and duties laid by any state on imports or exports shall be for the benefit of the treasury of the United States. Without the consent of congress no state may lay any duty on tonnage; keep troops or ships of war in times of peace; enter into any agreement or compact with another state or with a foreign power; or engage in war unless actually invaded, or in such imminent danger as will not admit of delay. Treason against the United States consists only in levying war against them, or in adhering to their enemies, giving them aid and comfort. The punishment of treason is left to be defined by congress, but no attainder of treason shall work corruption of blood or forfeiture except during the life of the person attainted. Full faith and credit shall be given in each state to the public acts, records, and judicial proceedings of every other state, and citizens of each state are entitled to all the privileges and immunities of citizens in the several states. Slavery is prohibited by the thirteenth amendment of the constitution. All persons born or naturalized in the United States are declared to be citizens thereof, and every state is prohibited from making or enforcing any law which shall abridge the privileges or immunities of such citizens. New states may be admitted into the Union by congress, but no new state can be erected within the jurisdiction of any other state, nor any state be formed by the junction of two or more states or parts of states, without the consent of the legislatures of the states concerned as well as of congress. The several states have exclusive power to prescribe the qualifications of voters and state officers, and the form of their state government. The constitution only requires that the form of government be republican, and that no law or ordinance be passed which would conflict with any law of the United States. Congress has power to dispose of and make all needful rules and regulations respecting the territories or other property belonging to the United States. Amendments to the constitution may be proposed by two thirds of both houses of congress, or by a convention convoked by congress on the application of the legislatures of two thirds of the states; they become valid when ratified by the legislatures of or conventions in three fourths of the states.—The army of the United States comprises 25 regiments of infantry, 10 of cavalry, and 5 of artillery, besides a corps of engineers, &c. The chief officers are: the general (in 1876, William T. Sherman), annual salary $13,500; the lieutenant general (Philip H. Sheridan), $11,500; three major generals, $7,500 each; and six brigadier generals, $3,500 each. The United States is divided into four military divisions, which are respectively under the command of the lieutenant general and the three major generals. The division of the Atlantic, with headquarters in New York, constitutes but one department; that of the Missouri, with headquarters in Chicago, comprises the departments of Dakota, Missouri, the Platte, and Texas; that of the South, headquarters in Louisville, Ky., includes the departments of the South and of the Gulf; that of the Pacific, headquarters in San Francisco, the departments of California, the Columbia, and Arizona. The numerical strength of the army is about 25,000 enlisted men. The national armory is at Springfield, Mass. There are United States arsenals at Augusta, Ga.; Augusta, Me.; Benicia, Cal.; Fort Union, N. M.; Indianapolis, Ind.; Jefferson Barracks, Mo.; New York city (arsenal and agency); Old Point Comfort, Va.; Philadelphia, Pa.; Pikesville, Md.; Pittsburgh, Pa.; Rock Island, Ill.; San Antonio, Texas; Vancouver, W. T.; Washington, D. C.; Watertown, Mass.; and West Troy, N. Y. The soldiers' home, for honorably discharged soldiers of the regular army who have served 20 years or have been discharged for disability contracted in the service, is situated in the District of Columbia, near Washington. It is under the supervision of a board of commissioners consisting of the surgeon general, adjutant general, and commissary general of subsistence of the army. The national home for disabled volunteer soldiers is at Dayton, Ohio, and has branches at Augusta, Me., Milwaukee, Wis., and Hampton, Va. These homes are under the direction of a board of managers, and are maintained by annual congressional appropriations. (See PENSION.) In 1876 there were for the interment of soldiers and sailors 81 national cemeteries in the United States, most of them being near famous battle fields of the war. The total number of interments to 1875 was 306,053. The cemeteries were classified as follows:

FIRST CLASS.

Arlington, Va.
Andersonville, Ga.
Beaufort, S. C.
City of Mexico, Mexico.
Corinth, Miss.
Camp Nelson, Ky.
Chattanooga, Tenn.
Chalmette, La.
Fredericksburg, Va.
Gettysburg, Pa.
Hampton, Va.
Jefferson Barracks, Mo.
Little Rock, Ark.
Mound City, Ill.
Memphis, Tenn.
Murfreesboro, Tenn.
Marietta, Ga.
Nashville, Tenn.
Natchez, Miss.
Pittsburgh Landing, Tenn.
Poplar Grove, Va.
Port Hudson, La.
Richmond, Va.
Salisbury, N. C.
Soldiers' Home, D. C.
Vicksburg, Miss.

SECOND CLASS.

Alexandria, Va.
Alexandria, La.
Brownsville, Texas.
Baton Rouge, La.
Barrancas, Fla.
City Point, Va.
Culpeper, Va.
Fort Leavenworth, Kan.
Fort Smith, Ark.
Florence, S. C.
Fort Scott, Kan.
Knoxville, Tenn.
Mill Springs, Ky.
Mobile, Ala.
New Berne, N. C.
Philadelphia, Pa.
Raleigh, N. C.
Wilmington, N. C.
Winchester, Va.
Yorktown, Va.

THIRD CLASS.

Annapolis, Md.
Ball's Bluff, Va.
Battle Ground, D. C.
Beverly, N. J.
Camp Butler, Ill.
Cave Hill, Ky.
Cold Harbor, Va.
Crown Hill, Ind.
Cypress Hills, N. Y.
Danville, Ky.
Danville, Va.
Fayetteville, Ark.
Finn's Point, N. J.
Fort Donelson, Tenn.
Fort Gibson, Indian Ter.
Fort Harrison, Va.
Fort McPherson, Neb.
Fort St. Philip, La.
Fort Vancouver, W. T.
Glendale, Va.
Grafton, W. Va.
Jefferson City, Mo.
Keokuk, Iowa.
Laurel, Md.
Lebanon, Ky.
Lexington, Ky.
Loudon Park, Md.
New Albany, Ind.
Rock Island, Ill.
San Antonio, Texas.
Santa Fé, N. M.
Seven Pines, Va.
Springfield, Mo.
Staunton, Va.
Woodlawn (Elmira), N. Y.

The law provides for the enrolment in the militia of every able-bodied male citizen of the respective states between the ages of 18 and 45 years, except those specially exempted. The organization and control of the militia when not in active service are left to the respective states. The president is empowered to call out the militia whenever the United States is invaded, or in imminent danger of invasion from any foreign nation or Indian tribe, or in case of rebellion. (See MILITIA, vol. xi., p. 540.) In 1876 the navy comprised 147 vessels of 152,492 tons measurement, carrying 1,195 guns. Of these, 26 were sailing vessels, 26 ironclads, and 95 ordinary steam vessels, including 25 tugs. The chief officers on the active list are the admiral (in 1876, David D. Porter), annual salary $13,000; vice admiral (Stephen C. Rowan), salary $9,000 when at sea and $8,000 when on shore duty; 12 rear admirals, each receiving $6,000 a year when at sea and $5,000 on shore duty; 25 commodores, 50 captains, and 90 commanders. The whole field of naval operations in every part of the world is divided into six stations, each commanded by a rear admiral, designated as the European, the Asiatic, the South Pacific, the North Pacific, the South Atlantic, and the North Atlantic. There are United States navy yards at Kittery, Me.; Boston, Mass.; New London, Conn.; Brooklyn, N. Y.; League Island (Philadelphia), Pa.; Washington, D. C.; Norfolk, Va.; Pensacola, Fla.; and Mare Island, Cal. Nine naval hospitals are maintained by the United States, as follows: Annapolis, Md.; Brooklyn, N. Y.; Chelsea, Mass.; Mare Island, Cal.; Norfolk, Va.; Pensacola, Fla.; Philadelphia, Pa.; Washington, D. C.; and Yokohama, Japan. (See Navy.)—The national debt of the United States, past and present, has accrued chiefly in consequence of the war of the revolution, that of 1812, the Florida war, the Mexican war, and the civil war. The cost of the revolutionary war was estimated by Hamilton at $135,193,703 in specie; the estimated cost of the war of 1812 was $75,450,930, and of the Mexican war $82,232,745. Acquisitions of territory have added $72,200,000 to the debt, as follows: the purchase of Louisiana from France in 1803, for $23,500,000 (including certain claims in addition to the price of the territory); of Florida from Spain in 1819 for $6,500,000; the Texas cession in 1850, $10,000,000; the acquisition of California from Mexico in 1848, $15,000,000; the Gadsden purchase from Mexico in 1853, $10,000,000; and the purchase of Alaska from Russia in 1867, $7,200,000. In 1790 the secretary of the treasury reported that the aggregate foreign and domestic debt on Dec. 31, 1784, was $54,124,464; the state debts, including interest, were estimated at $25,000,000. The outstanding principal of the public debt of the United States on Jan. 1 of each year from 1791 to 1843 inclusive, and on July 1 from 1844 to 1875, has been as follows:

YEARS.	Amount.	YEARS.	Amount.
1791	$75,463,476	1804	$86,427,120
1792	77,227,924	1805	82,312,150
1793	80,352,634	1806	75,723,270
1794	78,427,404	1807	69,218,398
1795	80,747,587	1808	65,196,317
1796	83,762,172	1809	57,023,192
1797	82,064,479	1810	53,173,217
1798	79,228,529	1811	48,005,587
1799	78,408,669	1812	45,209,737
1800	82,976,294	1813	55,962,827
1801	83,038,050	1814	81,487,846
1802	80,712,632	1815	99,833,660
1803	77,054,686	1816	127,334,933
1817	$123,491,965	1847	$38,826,534
1818	103,466,633	1848	47,044,862
1819	95,529,648	1849	63,061,858
1820	91,015,566	1850	63,452,773
1821	89,987,427	1851	68,304,796
1822	93,546,676	1852	66,199,341
1823	90,875,877	1853	59,803,117
1824	90,269,777	1854	42,242,222
1825	83,788,432	1855	35,586,956
1826	81,054,059	1856	31,972,537
1827	73,987,357	1857	28,699,831
1828	67,475,043	1858	44,911,881
1829	58,421,413	1859	58,496,837
1830	48,565,406	1860	64,842,287
1831	39,123,191	1861	90,580,873
1832	24,322,235	1862	524,176,412
1833	7,001,698	1863	1,119,772,138
1834	4,760,082	1864	1,815,784,370
1835	37,513	1865	2,680,647,869
1836	336,957	1866	2,773,236,173
1837	3,308,124	1867	2,678,126,103
1838	10,434,221	1868	2,611,687,851
1839	3,573,343	1869	2,588,452,213
1840	5,250,875	1870	2,480,672,427
1841	13,594,480	1871	2,353,211,332
1842	20,601,226	1872	2,253,251,328
1843	32,742,922	1873	*2,234,482,993
1844	23,461,652	1874	*2,251,690,468
1845	15,925,303	1875	*2,232,284,531
1846	15,550,202		

In 1835 the country was entirely out of debt, the small amount unpaid having been provided for. The total amount of loans and treasury notes issued by the government previous to the year 1861 was $492,371,087, all of which has been paid, with the exception of $1,408,050, which has matured but has not been presented for payment. The whole amount of loans and treasury notes issued since 1861 is $5,011,818,908. Under the acts of Feb. 8, July 17, and Aug. 5, 1861, were issued $207,736,350 of bonds redeemable in 1881, bearing 6 per cent. interest payable semi-annually, and known as sixes of '81. Under the acts of July 17, 1861, June 30, 1864, and March 3, 1865, treasury notes to the amount of $970,087,250 were issued in denominations of $50 and over, bearing 7$\frac{3}{10}$ per cent. interest, and known as seven-thirties. With an unimportant exception, all of these have been paid or funded. Under the acts of Feb. 25, 1862, March 3, 1864, and Jan. 28 and March 3, 1865, $1,602,697,000 of coupon and registered bonds were issued, redeemable after 5 and payable in 20 years, bearing 6 per cent. interest payable semi-annually in coin, and known as five-twenties of '62, '64, and '65, and consols of '65, '67, and '68; outstanding, April 1, 1876, $701,318,300. Under the act of March 3, 1864, were issued $196,117,300 of "ten-forty" bonds, redeemable in 10 and payable in 40 years in coin, with 5 per cent. interest payable semi-annually; outstanding, $194,566,300. Under the acts of July 14, 1870, and Jan. 20, 1871, were issued $500,000,000 of 5 per cent. bonds payable in coin after 10 years, and the interest quarterly. Under the act of March 3, 1863,

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* Included in these sums are certificates of deposit amounting to $31,730,000 in 1873, $58,760,000 in 1874, and $58,415,000 in 1875. These certificates are offset by notes held on deposit for their redemption, and should be deducted from the principal of the public debt in comparing with previous years.

$266,595,440 of compound interest notes were issued, payable in three years with 6 per cent. interest; outstanding April 1, 1876, $336,700. The acts of Feb. 25 and July 11, 1862, authorized the issue of $300,000,000 of legal-tender notes fundable into a bond bearing 6 per cent. interest in gold. The demand notes previously issued, $60,000,000, were also made a legal tender by the act of March 17, 1862. The act of March 3, 1863, authorized an additional issue of $150,000,000; and the right to exchange such notes for 6 per cent. bonds was limited to July 1, 1863. The act of June 30, 1864, provided that the total amount of such notes should not exceed $400,000,000, and such additional sum, not exceeding $50,000,000, as might be lawfully required for the redemption of temporary loans. The amount outstanding on April 1, 1876, was $370,823,645. (See MONEY, vol. xi., p. 743.) On Jan. 1, 1861, the debt amounted to $66,243,721. During the next six months it increased at the rate of about $4,000,000 a month; during the year beginning July 1, 1862, at the rate of about $36,000,000 a month; during the following year at the rate of $49,500,000 a month. Increasing more than $70,500,000 a month from Dec. 1, 1863, to April 1, 1865, and $84,400,000 a month during the five months following, it reached its maximum on Aug. 31, 1865, when it amounted to $2,845,907,626, composed as follows:

Funded debt	$1,109,568,192
Matured debt	1,503,020
Temporary loans	107,148,713
Certificates of debt	85,093,000
Five per cent. legal-tender notes	33,954,230
Compound interest legal-tender notes	217,024,160
Seven-thirty notes	830,000,000
United States notes (legal tenders)	433,160,569
Fractional currency	26,344,742
Suspended requisitions uncalled for	2,111,000

Of these obligations, $684,138,959 were a legal tender in the payment of all debts, public and private, except customs duties and interest on the public debt. The amount of legal-tender notes, demand notes, fractional currency, and national bank notes outstanding on Aug. 31, 1865, and annually thereafter, from Jan. 1, 1866, to Jan. 1, 1876, inclusive, was:

DATES.	UNITED STATES ISSUES.				National bank notes, including national gold bank notes.	Aggregate.
	Fractional currency.	Old demand notes.	Legal-tender notes.*	Total.		
August 31, 1865	$26,344,742	......	$433,160,569	$459,505,311	$176,213,955	$635,719,266
January 1, 1866	26,000,420	......	426,231,389	452,231,809	298,588,419	750,820,228
" 1, 1867	28,732,812	......	380,497,842	409,230,654	299,846,206	709,076,860
" 1, 1868	31,597,583	......	356,159,127	387,756,710	299,747,569	687,504,279
" 1, 1869	34,215,715	......	356,021,073	390,236,788	299,629,322	689,866,110
" 1, 1870	39,762,664	$113,098	356,000,000	395,875,762	299,904,029	695,779,791
" 1, 1871	39,995,089	101,086	356,000,000	396,096,175	306,307,672	702,403,847
" 1, 1872	40,767,877	92,801	357,500,000	398,360,678	328,465,431	726,826,109
" 1, 1873	45,722,061	84,387	358,557,907	404,364,855	344,582,812	748,947,167
" 1, 1874	48,544,792	79,637	378,401,702	427,026,131	350,848,236	777,874,367
" 1, 1875	46,390,598	72,317	382,000,000	428,462,915	354,128,250	782,591,165
" 1, 1876	44,147,072	69,642	371,827,220	416,043,934	346,479,756	762,523,690

The refunding of the national debt was authorized by the acts of congress of July 14, 1870, and Jan. 20, 1871. The amount of six per cent. gold-bearing bonds outstanding on Jan. 1, 1870, was $1,886,349,800, and of five per cent. bonds $221,589,300. On Jan. 1, 1876, the former amounted to $1,017,615,400, and the latter to $670,384,750, showing a decrease in the funded debt of $419,938,950. The reduction in the total debt during this period (excluding $35,175,000 of special deposits of legal-tender notes) was $435,716,254. The temporary loans, certificates of indebtedness, seven-thirty notes, and all the items of the debt bearing interest in lawful money, with the exception of the navy pension fund, either have been paid, have matured and ceased to bear interest, or have been funded. The public debt outstanding on April 1, 1876, is shown in the following statement. Besides this, $64,623,512 of 6 per cent. bonds, maturing 30 years from their date, have been issued to the several Pacific railway companies, which are to pay them at maturity.

Debt bearing interest in coin:		
Bonds at 6 per cent.	$984,999,650 00	
Bonds at 5 per cent.	710,037,600 00	
		$1,695,037,250 00
Debt bearing interest in lawful money:		
Navy pension fund at 3 per cent.		14,000,000 00
Debt on which interest has ceased since maturity		9,183,360 26
Debt bearing no interest:		
Old demand and legal-tender notes	$370,823,645 50	
Certificates of deposit	34,230,000 00	
Fractional currency	42,604,893 71	
Coin certificates	32,337,600 00	
		479,996,139 21
Total debt		$2,198,216,749 47

The total receipts and expenditures of the government during each decade to 1860 were:

PERIODS.	RECEIPTS.		EXPENDITURES.	
	Net ordinary.	Gross.	Net ordinary.	Gross.
1791–1800	$56,800,000	$77,200,000	$34,000,000	$75,000,000
1800–1810	132,000,000	183,600,000	55,900,000	131,900,000
1810–1820	201,800,000	312,400,000	182,900,000	314,200,000
1820–1830	212,200,000	230,800,000	122,000,000	226,600,000
1830–1840	310,000,000	329,500,000	230,700,000	300,600,000
1840–1850	246,400,000	374,200,000	293,900,000	374,400,000
1850–1860	589,200,000	646,200,000	545,500,000	645,800,000

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* No interest-bearing notes, but demand notes only, are included with legal-tender notes from Aug. 31, 1865, to Jan. 1, 1870.

The annual receipts and expenditures of the government for 20 years, with the chief sources and objects, have been as follows, the fiscal year ending June 30:

RECEIPTS.

YEARS.	Customs.	Internal revenue.	Direct tax.	Public lands.	Miscellaneous.	Net ordinary receipts.	Premiums.	Receipts from loans and treasury notes.	Gross receipts.
1856.......	$64,022,863	....	....	$8,917,644	$1,116,190	$74,056,699	....	$200	$74,056,899
1857.......	63,875,905	....	....	3,829,486	1,259,920	68,965,312	....	3,900	68,969,212
1858.......	41,789,620	....	....	3,513,715	1,352,029	46,655,365	....	23,717,800	70,372,665
1859.......	49,565,824	....	....	1,756,687	1,454,596	52,777,107	$709,357	28,287,500	81,778,965
1860.......	53,187,511	....	....	1,778,557	1,088,530	56,054,599	10,008	20,776,800	76,841,407
1861.......	39,582,125	....	....	870,658	1,023,515	41,476,299	33,630	41,861,709	83,371,640
1862.......	49,056,397	....	$1,795,331	152,203	915,327	51,919,261	68,400	529,692,460	581,680,121
1863.......	69,059,642	$37,640,787	1,485,103	167,617	3,741,794	112,094,945	602,345	776,682,361	889,379,652
1864.......	102,316,152	109,741,134	475,648	588,333	30,291,701	243,412,971	21,174,101	1,128,873,945	1,393,461,017
1865.......	84,928,260	209,464,215	1,200,573	996,553	25,441,556	322,031,158	11,683,446	1,472,224,740	1,805,939,345
1866.......	179,046,651	309,226,813	1,974,754	665,031	29,036,314	519,949,564	38,083,055	712,851,538	1,270,884,173
1867.......	176,417,810	266,027,537	4,200,233	1,163,575	15,037,522	462,846,679	27,787,330	640,426,910	1,131,060,920
1868.......	164,464,599	191,087,589	1,788,145	1,348,715	17,745,403	376,434,453	29,203,629	625,111,433	1,030,749,516
1869.......	180,048,426	158,356,460	765,685	4,020,344	13,997,338	357,188,256	13,755,491	238,678,081	609,621,828
1870.......	194,538,374	184,899,756	229,102	3,350,481	12,942,118	395,959,833	15,295,643	285,474,496	696,729,973
1871.......	206,270,408	143,098,153	580,355	2,388,646	22,093,541	374,431,104	8,892,839	268,768,523	652,092,468
1872.......	216,370,286	130,642,177	....	2,575,714	15,106,051	364,694,229	9,412,637	305,047,054	679,153,921
1873.......	188,089,522	113,729,314	315,254	2,882,312	17,161,270	322,177,673	11,560,530	214,931,017	548,669,221
1874.......	163,103,833	102,409,784	....	1,852,428	*32,575,043	299,941,090	5,037,665	439,272,535	744,251,291
1875.......	157,167,722	110,007,493	....	1,413,640	15,431,915	284,020,771	3,979,279	387,971,556	675,971,607

EXPENDITURES.

Y'RS.	War.	Navy.	Indians.	Pensions.	Miscellaneous.	Net ordinary expenditures.	Premiums.	Interest.	Public debt.	Gross expenditures.
1856	$16,963,160	$14,074,834	$2,644,263	$1,296,229	$31,794,038	$66,772,527	$385,372	$1,953,822	$3,614,618	$72,726,341
1857	19,159,150	12,651,694	4,354,418	1,310,380	28,565,498	66,041,143	363,572	1,593,265	3,276,606	71,274,587
1858	25,679,121	14,053,264	4,978,266	1,219,768	26,400,016	72,330,437	574,443	1,652,055	7,505,250	82,062,186
1859	23,154,720	14,690,927	3,490,534	1,222,222	23,797,544	66,355,950	....	2,637,649	14,685,043	83,678,642
1860	16,472,202	11,514,649	2,991,121	1,100,802	27,977,978	60,056,754	....	3,144,120	13,854,250	77,055,125
1861	23,001,530	12,387,156	2,865,481	1,034,599	23,327,287	62,616,055	....	4,034,157	18,737,100	85,387,813
1862	389,173,562	42,640,353	2,327,948	852,170	21,385,862	456,379,896	....	13,190,344	96,097,322	565,667,563
1863	603,314,411	63,261,235	3,152,032	1,078,513	23,198,382	694,004,575	....	24,729,700	181,081,635	899,815,911
1864	690,391,048	85,704,963	2,629,975	4,985,473	27,572,216	811,283,679	....	53,685,421	430,572,014	1,295,541,114
1865	1,030,690,400	122,617,434	5,059,360	16,347,621	42,989,383	1,217,704,199	1,717,900	77,395,090	609,616,141	1,906,433,831
1866	283,154,676	43,285,662	3,295,729	15,605,549	40,613,114	385,954,731	58,476	133,067,624	620,263,249	1,139,344,081
1867	95,224,415	31,034,011	4,642,531	20,936,551	51,110,223	202,947,733	10,813,349	143,781,591	735,536,980	1,093,079,655
1868	123,246,648	25,775,502	4,100,682	23,782,386	53,009,867	229,915,088	7,001,151	140,424,045	692,549,685	1,069,889,970
1869	78,501,990	20,000,757	7,042,923	28,476,621	56,474,061	190,496,354	1,674,680	130,694,242	261,912,718	584,777,996
1870	57,655,675	21,780,229	3,407,938	28,340,202	53,237,461	164,421,507	15,996,555	129,235,498	393,254,282	702,907,842
1871	35,799,991	19,431,027	7,426,997	34,443,894	60,481,916	157,583,827	9,016,794	125,576,565	399,503,670	691,680,858
1872	35,372,157	21,249,809	7,061,728	28,533,402	60,984,757	153,201,856	6,958,266	117,357,839	405,007,807	682,525,270
1873	46,323,138	23,526,256	7,951,704	29,359,426	73,328,110	180,488,636	5,105,919	104,750,688	233,699,352	524,044,597
1874	42,313,927	30,932,587	6,692,462	29,038,414	*85,141,593	194,118,985	1,395,073	107,119,815	422,065,060	724,698,933
1875	41,120,645	21,497,626	8,384,656	29,456,216	71,070,702	171,529,848	....	103,093,544	407,877,492	682,000,885

The receipts and expenditures of the post office department are not included in the above statement. They are given from 1790 to 1874 in the article POST, vol. xiii., p. 754. The receipts for the year ending June 30, 1875, were $26,791,360, of which $24,490,942 were for stamps, stamped envelopes, and postal cards. The expenditures were $33,611,309, of which $18,779,201 were for transportation of the mails, $10,464,746 for compensation of postmasters and clerks, $1,877,210 for compensation of letter carriers, and $724,186 for postage stamps. (For particulars concerning internal revenue, see TAXES, vol. xv., p. 589.) The total production of gold from 1848 to 1874, inclusive, was $1,282,927,092; of silver, $217,051,114. The coinage of the mints from 1793 to Jan. 1, 1876, was: of gold, $920,070,958; of silver, $169,669,963; of minor coinage, $12,717,198. Of this amount, $471,433,936 of gold, $116,153,632 of silver, and all of the minor, were coined at Philadelphia; and $390,427,157 of gold, and $19,175,425 of silver, coined at San Francisco. (See GOLD, SILVER, and MINT.)—A law for the establishment of a national banking system was passed by congress in February, 1863, and was superseded by the national bank act of June 3, 1864. (See BANK, vol. ii., p. 281.) The act of June 20, 1874, authorized the retirement of the circulation of national banks, and the surrender of bonds held as security therefor, upon the deposit of legal-tender notes in the treasury for the amount of the circulation thus retired. It also repealed the provision requiring a reserve on circulation, and provided for a system of redemption of national bank notes in the treasury department. The act of Jan. 14, 1875, provides for the unlimited issue of circulating notes to national banks, subject to the provisions of existing laws, and the reduction of the legal-tender notes at the rate of 80 per cent. upon the amount of additional bank notes issued, until the legal-tender notes shall be reduced to $300,000,000. The following table exhibits

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* Including the Geneva award, $15,500,000.

in millions of dollars the resources and liabilities of state banks in the years 1857 and 1875, and of national banks in 1865 and 1875:

RESOURCES.	STATE BANKS.		NATIONAL BANKS.	
	Jan., 1857, 1,416 bks.	Jan., 1875, 551 bks.	Oct., 1865, 1,513 bks.	Oct., 1875, 2,087 bks.
	Millions.	Millions.	Millions.	Millions.
Loans and discounts....	$684·5	$176·3	$487·2	$984·7
Bonds for circulation...	.....	·3	272·6	370·8
Other stocks and bonds.	59·3	23·7	155·1	61·6
Due from banks........	65·9	19·9	107·4	144·7
Real estate............	26·1	9·0	14·7	42·4
Specie.................	58·3	1·2	18·1	8·1
Legal-tenders and bank notes................	28·1	26·7	206·2	97·6
United States certificates	.....	.....	.....	48·8
Clearing-house exch'ges.	.....	.....	.....	75·1
Due from U. S. treasurer	.....	.....	.....	19·7
Other resources........	31·0	15·2	98·5	29·2
Total..............	$953·2	$272·3	$1,359·8	$1,882·2

LIABILITIES.	STATE BANKS.		NATIONAL BANKS.	
	Jan., 1857, 1,416 bks.	Jan., 1875, 551 bks.	Oct., 1865, 1,513 bks.	Oct., 1875, 2,087 bks.
	Millions.	Millions.	Millions.	Millions.
Capital stock...........	$370·8	$69·1	$393·2	$504·8
Surplus fund...........	.....	6·8	38·7	134·4
Other profits...........	59·7	9·0	32·4	53·0
Circulating notes.......	214·8	·2	171·3	318·4
Deposits...............	230·4	165·9	549·1	675·4
Due to banks..........	57·7	10·5	174·2	179·7
Other liabilities........	19·8	10·8	·9	16·5
Total..............	$953·2	$272·3	$1,359·8	$1,882·2

The following table exhibits for each year, from 1868 to 1875 inclusive, the amount of circulation and of net deposits of the national banks, together with the reserve required and held by them, the figures below hundreds of thousands being omitted:

DATES.	Number of banks.	LIABILITIES.			RESERVE.			CLASSIFICATION OF RESERVE.		
		Circulation.	Net deposits.	Total.	Required.	Held.	Ratio.	Specie.	Other lawful money.	Due from agents.
		Millions.	Millions.	Millions.	Millions.	Millions.	Per cent.	Millions.	Millions.	Millions.
Oct. 5, 1868.....................	1,645	$295·7	$559·2	$854·9	$172·8	$234·5	27·4	$11·5	$156·0	$67·0
Oct. 9, 1869.....................	1,617	293·6	504·4	798·0	160·1	208·2	26·1	22·0	129·5	56·7
Oct. 8, 1870.................	1,615	291·8	523·5	815·3	163·2	208·4	24·9	14·5	122·6	66·3
Oct. 2, 1871.....................	1,767	315·5	636·7	952·2	191·3	233·4	24·5	12·0	134·5	86·9
Oct. 3, 1872.....................	1,919	333·5	619·8	953·3	187·4	209·9	22·0	10·2	119·0	80·7
Sept. 12, 1873..................	1,976	339·1	673·3	1,012·4	199·5	229·1	22·6	19·9	113·1	96·1
Oct. 2, 1874.....................	2,004	333·2	717·3	1,050·5	210·0	244·9	23·3	21·2	139·8	83·9
Oct. 1, 1875.....................	2,087	318·4*	731·9	1,050·3	208·9	235·1	22·4	8·1	141·4	85·6

The total amount of circulation on March 1, 1876, was $342,819,073, of which $24,452,580 is being retired, lawful money having been deposited with the treasurer for that purpose. The remainder of the circulation, $318,366,493, is secured by $356,680,150 of United States bonds, the value of which in currency on March 1, 1876, was $427,947,224, and in gold $374,582,200. The following statement shows by geographical divisions the average number of national, state, private, and savings banks during the six months ending May 31, 1875, with their average capital and deposits in millions of dollars:

GEOGRAPHICAL DIVISIONS.	NATIONAL BANKS.			STATE BANKS AND PRIVATE BANKERS.			SAVINGS BANKS WITH CAPITAL.			SAVINGS BANKS WITHOUT CAPIT'L.	
	Number.	Capital.	Deposits.	Number.	Capital.	Deposits.	Number.	Capital.	Deposits.	Number.	Deposits.
		Millions.	Millions.		Millions.	Millions.		Millions.	Millions.		Millions.
New England states...	511	$161·7	$132·5	128	$11·4	$22·5	2	$0·3	$4·7	426	$395·7
Middle states.........	595	190·3	387·2	1,307	98·1	232·2	8	0·2	2·3	215	369·0
Southern states.......	175	34·5	38·0	529	35·5	45·4	5	0·5	0·5	5	1·9
Western states and territories.............	753	110·4	162·5	1,808	66·7	176·3	22	4·9	33·1	40	48·4
United States.....	2,034	$496·9	$720·2	3,767	$211·7	$476·4	37	$5·9	$40·6	686	$815·0

—There is no national system of education in the United States, and the general government exercises no control over public schools and makes no regular provision for their support, except that the military academy at West Point, N. Y., the school of artillery at Fortress Monroe, Va., and the naval academy at Annapolis, Md., are wholly supported and controlled by the government. Officers are also detailed by the government to give military instruction in certain colleges. (See MILITARY SCHOOLS, and ANNAPOLIS. For the aid given by the government for the advancement of learning, see SMITHSONIAN INSTITUTION.) The regulation of all matters pertaining to education is left entirely to the states, each of which maintains a system of public instruction independently of the others. In each state free common schools are provided by law for all persons of school age. But the general government has made liberal provision for purposes of education by various grants of land, dating as far back as 1803. More than 75,000,000 acres of land have thus been set apart for common schools and universities, including 7,830,000 reserved by act of congress passed July 2, 1862, for the establishment in the several states of colleges for the benefit of agriculture and the mechanic arts. The organization and control of these institutions are given to the respective states, and many of them are in operation. The following are the most important facts relating to the common schools in the United States in 1874, as reported by the bureau of education, the number of states in the Union being 37, and of territories, including the District of Columbia, 11:

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* The total amount of circulation outstanding on Oct. 1, 1875 (2,302 banks), was $347,900,082, which amount includes the notes in circulation of banks which have failed, are in liquidation, and have deposited legal-tender notes under the act of June 20, 1874.

PARTICULARS.	NUMBER REPORTING.		In states.	In territories.
	States.	Territories.		
School population......	37	11	13,735,672	139,378
Estimated number between 6 and 16 years of age..............	......	......	10,442,492	94,155
Number enrolled in public schools...........	34	11	8,030,772	69,209
Number in daily attendance...............	30	4	4,488,075	33,489
Pupils in private schools	13	5	352,460	10,128
Total number of teachers	35	8	239,873	1,427
Male.......	28	7	87,395	499
Female.............	28	7	129,049	731
Public school income...	37	10	$81,277,688	$881,219
" " expenditure	35	9	$74,169,217	$805,121
Permanent school fund.	28	..	$75,251,008	....

The higher and special institutions of instruction were as follows:

INSTITUTIONS.	Number.	Teachers.	Pupils.
City schools.....................	....	16,438	976,837
Normal schools...................	124	966	24,405
Business colleges.............. .	126	577	25,892
Academies.......................	1,031	5,466	98,179
Preparatory schools	91	697	11,414
Scientific and agricultural schools	72	609	7,244
Colleges for women	209	2,285	23,445
Universities and colleges........	343	3,783	56,692
Theological schools..............	113	579	4,356
Law schools.....................	38	181	2,585
Medical schools..................	99	1,121	9,095
Regular......................	63	780	6,888
Eclectic.....................	4	36	303
Homœopathic.................	7	122	565
Dental.......................	11	133	431
Pharmaceutical..............	14	50	908
Institutions for the blind........	29	525	1,942
" " deaf and dumb...	40	275	4,900
" " feeble-minded ...	9	312	1,265
Kindergärten....................	55	125	1,636

The charitable educational institutions embraced, besides those mentioned for the blind, deaf and dumb, and feeble-minded, 56 reform schools, 156 orphan asylums, 21 soldiers' orphans' homes, 9 infant asylums, and 57 miscellaneous charities. There were 26 industrial schools, with 259 teachers and 6,096 pupils. Art instruction, including training in industrial art, was afforded by 26 institutions. There were 44 museums of natural history, and 27 of art. (See Education, vol. vi., pp. 424–431.) No general provision is made by the United States for the treatment of the insane, idiotic, deaf and dumb, or blind. Such institutions are organized and maintained by the states and by corporations. (See Blind, Deaf and Dumb, Idiocy, and Insanity.) There is a government hospital for the insane in the District of Columbia, intended for the treatment of the insane of that district and of the army and navy. The superintendent is appointed by the secretary of the interior. The Columbia deaf and dumb institution is intended primarily for the deaf and dumb of the District of Columbia; but pupils residing in the states, not exceeding 40 in number, may be admitted to the collegiate department without charge for tuition. For an account of the charitable and reformatory institutions maintained or aided by congress in the District of Columbia, see District of Columbia, and Washington. United States prisoners are confined in state or territorial prisons. For the prison systems of the states and the mode of treating paupers, see Prisons and Prison Discipline, and Pauperism; see also Reformatories.—The total number of libraries in 1870 was 164,815, having 45,528,938 volumes. Of these, 108,800 with 26,072,420 volumes were private, and 56,015 with 19,456,518 volumes other than private. They were classified as follows: 1 congressional library, with 190,000 volumes; 14 departmental, 115,185; 53 state and territorial, 653,915; 1,101 town, city, &c., 1,237,430; 1,073 court and law, 425,782; 14,375 school, college, &c., 3,598,537; 33,580 Sabbath school, 8,346,153; 4,478 church, 1,634,915; 47 of historical, literary, and scientific societies, 590,002; 9 of charitable and penal institutions, 13,890; 43 of benevolent and secret associations, 114,581; and 1,241 circulating, 2,536,128. In 1876 the library of congress had more than 300,000 volumes. (See Library, vol. x., p. 404.)—The whole number of newspapers and periodicals in 1870 was 5,871, having an aggregate circulation of 20,842,475, and issuing annually 1,508,548,250 copies. There were 574 daily, with a circulation of 2,601,547; 107 tri-weekly, 155,105; 115 semi-weekly, 247,197; 4,295 weekly, 10,594,643; 96 semi-monthly, 1,349,820; 622 monthly, 5,650,843; 13 bi-monthly, 31,650; and 49 quarterly, 211,670. In 1875 the total number was reported at 7,870, including 718 daily, 80 tri-weekly, 107 semi-weekly, 6,957 weekly, 24 bi-weekly, 106 semi-monthly, 802 monthly, 8 bi-monthly, and 68 quarterly. (See Newspapers, vol. xii., p. 342.)—There is no established or state church in the United States. The most numerous denominations are the Methodists, Roman Catholics, Baptists, and Presbyterians, which are generally found in all parts of the country, though the number of Presbyterians is not great in New England, and the Baptist denomination is not relatively so strong there as in other parts of the country. But a small proportion of the Roman Catholics are of American parentage, being mostly of Irish, German, and French nativity. Of the 2,887 Congregational organizations reported by the census of 1870, 1,400 were in New England and 1,178 in New

York, Illinois, Ohio, Iowa, Wisconsin, and Michigan. The greatest numerical strength of the Friends is in Pennsylvania, though the denomination is well represented in Ohio, New York, Iowa, Indiana, New Jersey, Massachusetts, North Carolina, and Maryland. The Jews are found in most of the states, chiefly in the largest cities, the greatest numbers being in New York, Pennsylvania, Illinois, and California. More than a third of all the Lutherans were reported in Pennsylvania and Ohio. Of the 72 Moravian organizations, 15 were in Pennsylvania, 13 in Wisconsin, 10 in North Carolina, 6 each in New York and Minnesota, and 5 in Iowa. The Mormons are almost exclusively in Utah. Of the 471 organizations of the Reformed church in America (late Dutch Reformed), 304 were in New York, 97 in New Jersey, and 22 in Michigan; and of the 1,256 of the Reformed church in the United States (late German Reformed), 712 were in Pennsylvania and 288 in Ohio. Of the 18 Shaker organizations, 15 were in Maine, Massachusetts, New Hampshire, New York, and Ohio. More than half of the Spiritualists are in Massachusetts and Michigan. Of the 331 Unitarian societies, 180 were in Massachusetts, 23 in New Hampshire, and 22 in New York. Seven Chinese religious organizations were reported in California. The total number of religious organizations, as reported by the census of 1870, was 72,459, having 63,082 edifices with 21,665,062 sittings, and property valued at $354,483,581. The denominations were represented as follows:

DENOMINATIONS.	Organizations.	Edifices	Sittings.	Property.
Baptist, regular	14,474	12,857	3,997,116	$39,229,221
" other	1,355	1,105	363,019	2,378,977
Christian	3,578	2,822	865,602	6,425,137
Congregational	2,887	2,715	1,117,212	25,069,698
Episcopal, Protestant	2,835	2,601	991,051	36,514,549
Evangelical Association	815	641	193,796	2,301,650
Friends	692	662	224,664	3,939,560
Jewish	189	152	73,265	5,155,234
Lutheran	3,032	2,776	977,332	14,917,747
Methodist	25,278	21,337	6,528,209	69,854,121
Miscellaneous	27	17	6,935	135,650
Moravian (Unitas Fratrum)	72	67	25,700	709,100
Mormon	189	171	87,838	656,750
New Jerusalem (Swedenborgian)	90	61	18,755	869,700
Presbyterian, regular	6.262	5,683	2,198,900	47,828.732
" other	1,562	1,388	499,344	5,436,524
Reformed Church in America (late Dutch Reformed)	471	463	227,228	10,359,255
Reformed Church in the United States (late German Reformed)	1,256	1,145	431,700	5,775.215
Roman Catholic	4,127	3,806	1,990,514	60,985,566
Second Advent	225	140	34,555	306,240
Shaker	18	18	8,850	86,900
Spiritualist	95	22	6,970	100.150
Unitarian	331	310	155,471	6,282.675
United Brethren in Christ	1,445	937	265,025	1,819,810
Universalist	719	602	210,884	5,692,325
Unknown (local missions)	26	27	11.925	687.800
Unknown (union)	409	552	153,202	965,295

Among the miscellaneous denominations were 7 Chinese and 2 Greek organizations in California; 1 Bible Communist in Connecticut and 2 in New York; 1 Catholic Apostolic each in Connecticut, Illinois, and Massachusetts, and 2 in New York; 1 Sandemanian in Connecticut; 1 Plymouth church in Massachusetts; 1 Bible Christian and 1 Schwenkfelder in Pennsylvania; and 1 Huguenot in South Carolina.

—History. When first visited by the Europeans, the country now comprised within the United States was exclusively inhabited by the red or copper-colored race commonly called American Indians. Of the origin of these people nothing is positively known, though their own vague traditions and their general resemblance to the tribes of N. E. Asia give a certain degree of plausibility to the theory that their ancestors came to America by way of Behring strait or the Aleutian islands. There is reason to believe that these savages were not the first occupants of the land, in almost every part of which, and especially in the valley of the Mississippi, are found monuments consisting of mounds and other earthworks of great extent, which must have been erected by an unknown and long extinct race. In physical appearance, manners, customs, religion, and social and political institutions, the Indians were so strikingly alike as to form but one people; yet they were divided into a multitude of tribes almost perpetually at war with each other, and speaking a great variety of dialects. While in possession of its savage aborigines, the country from the Mississippi to the Atlantic, and from the lakes to the gulf of Mexico, with comparatively slight exceptions, was one vast forest, inhabited by wild beasts, whose pursuit formed the principal occupation of the Indians, and gave them their chief means of subsistence and clothing. (See American Antiquities, American Indians, and American Indians, Languages of the.) According to the Scandinavian sagas, Leif, a Norwegian, sailed about 1001 from Iceland for Greenland, but was driven southward by storms till he reached a country called Vinland, from the wild grapes he found growing there. Other Scandinavian adventurers followed him, and made settlements, none of which were permanent. By many writers Vinland is supposed to have been Rhode Island or some other part of the coast of New England, but of its real position nothing is certainly known. If these northern legends be rejected as too vague to afford a basis for history, we must conclude that the territory now comprised within the United States was first visited by Europeans about five years after Columbus discovered the West Indies. In 1497 John Cabot, a Venetian, commanding an English ship under a commission from Henry VII., sailed from Bristol westward, and on June 24 discovered land (coast of Labrador), along which he coasted to the southward nearly 1,000 m., landing at various points, and planting on the soil the banners of England and of Venice. In 1498 his son Sebastian Cabot sailed with two ships from Bristol in search of a northwest passage to China;

but finding the ice impenetrable, he turned to the south and coasted along as far as the entrance of Chesapeake bay. A few years later, about 1508, it is probable that Verrazzano, a Florentine in the French service, made a cruise on the coast of North America; but there is no authentic account of his discoveries, the letter over his signature addressed to Francis I. and long received as genuine being now suspected to be spurious. In 1513 the Spaniard Ponce de Leon discovered Florida, and took formal possession of the country near where St. Augustine now stands; but on attempting afterward to plant a colony, he was repulsed and mortally wounded by the natives. In 1539 took place the famous expedition of the Spaniard De Soto, who landed with several hundred followers in Tampa bay on the west coast of Florida, and fought his way in the course of two years through the region which now forms the states of Georgia, Alabama, and Mississippi, to the river Mississippi, beyond which he penetrated for about 200 m., and to which he returned to die in 1542. After his death his discouraged followers descended the river in boats, and crossed the gulf to the Spanish settlements in Mexico. For a long period no further attempt was made by the Spaniards to colonize Florida. But in 1562 the French Calvinists, under the direction of Admiral Coligni, endeavored to found there a colony which might become a place of refuge for the persecuted Huguenots. Charles IX. conceded an ample charter, and an expedition under Jean Ribault made a settlement at Port Royal in South Carolina, the name of Carolina being then first given to the country in honor of King Charles. This colony was soon abandoned, and another, composed also of Protestants, was planted on the banks of the St. John's in Florida, which in 1565 was surprised and massacred by the Spaniards, who in the same year founded St. Augustine, the first permanent settlement in the United States.—The discoveries of the Cabots had given the English crown a claim to North America, which, though not prosecuted for nearly a century, was never relinquished, and which in the reign of Elizabeth led to efforts at colonization on a large scale. In 1585 an expedition sent by Sir Walter Raleigh made a settlement on Roanoke island in North Carolina, which failed so utterly that in a few years not a trace of it remained. In 1602 Bartholomew Gosnold effected a settlement on the Elizabeth islands in Massachusetts, which was abandoned the same year. James I. in 1606 established two great divisions in the American territory claimed by England: South Virginia, extending from Cape Fear to the Potomac, and North Virginia, from the mouth of the Hudson to Newfoundland. Two companies were formed in England for the colonization of America: the London company, to which was granted South Virginia, and the Plymouth company, to which was granted North Virginia; and it was agreed that the region between the Potomac and the Hudson should be neutral ground on which either company might make settlements. The London company sent out three ships and 105 emigrants, who entered Chesapeake bay, and founded on May 13, 1607, the commonwealth of Virginia by building Jamestown on James river, both names being given in honor of the English king. Capt. Newport commanded the expedition, but the master spirit of the enterprise was the celebrated Capt. John Smith. The natives were conciliated by the marriage of Pocahontas, the daughter of their king or principal chief Powhatan, to an Englishman, and remained friendly for some years. The government of Virginia was at first retained by the king in the hands of councils subject to his appointment or control; but after repeated changes the constitution was at length so framed that a house of burgesses chosen by the people was instituted, which met for the first time July 30, 1619. This was the beginning of representative government in America. In August, 1619, a Dutch man-of-war entered James river, and sold 20 Africans to the planters, thus introducing slavery into the colony; and in 1621 the cultivation of cotton was begun. Capt. John Smith had returned to England in 1609, and in 1614 sailed again for America; and having examined the coast from the Penobscot to Cape Cod, he named the country New England. On his return home he published a map and description of New England, which, together with his personal representations of the advantages of emigration, excited much enthusiasm in England for colonizing America; and a patent was obtained from the king for a new company incorporated as "the council established at Plymouth in the county of Devon for the planting, ruling, ordering, and governing New England in America," which gave the planters absolute property, with unlimited jurisdiction, the sole powers of legislation, and the appointment of all officers and all forms of government, over the territory, extending in breadth from the 40th to the 48th degree of north latitude, and in length from the Atlantic to the Pacific. The first English settlement within its limits, however, was established without the knowledge of the corporation and without the aid of King James, by the "pilgrim fathers of New England," a body of Puritans (102 in number) who, led by John Carver, William Brewster, William Bradford, Edward Winslow, and Miles Standish, sailed from England, Sept. 6, 1620, in the Mayflower, a vessel of 180 tons burden. They anchored first at Cape Cod (Nov. 9), and on Dec. 11 (O. S.) an exploring party landed at a harbor in Massachusetts bay, where the Mayflower anchored a few days afterward. Here they began to build a town, which they called Plymouth in memory of the hospitalities received at the last English port from which they had sailed. The government of the colony was strictly republican. The governor was elected by the people, and restricted by a council of five (afterward seven) assistants. The legislature at first comprised the whole body of the people, but as population advanced the representative system was adopted. The foundation of the Plymouth colony was followed by that of Massachusetts Bay, where Salem was settled by John Endicott in 1628. A reënforcement of 400 colonists landed in 1629. In 1630 a fleet arrived with about 700 additional emigrants, with John Winthrop as governor, and Thomas Dudley as deputy governor. In September of the same year they settled Boston, which they named in honor of the town in England from which came their minister, the Rev. John Cotton. In 1692 Plymouth colony was united to Massachusetts. While these settlements on Massachusetts bay were in progress, Sir Ferdinando Gorges and John Mason obtained a patent for a territory called Laconia, extending from the Atlantic to the St. Lawrence and from the Merrimack to the Kennebec, and settled Portsmouth and Dover in New Hampshire in 1623. In Maine a French colony had been planted in the island of Mount Desert as early as 1613, which was soon broken up by an expedition from Virginia; and the first permanent English settlements in Maine were made at Monhegan in 1622 and at Saco about the same time, or according to Bancroft, probably at the mouth of the Pemaquid in 1626. These settlements ultimately fell under the jurisdiction of Massachusetts, and Maine continued to form a part of that commonwealth till 1820. Connecticut was colonized in 1635–'6 by emigrants from Massachusetts, who settled at Hartford, Windsor, and Wethersfield, though a trading post had been established at Windsor somewhat earlier, and the Dutch, who claimed the territory, had built a fort and trading house at Hartford in 1633. Rhode Island was first settled at Providence in 1636 by Roger Williams, who had been exiled from Massachusetts for maintaining religious and political opinions at variance with those of the rulers of that colony. In September, 1609, Henry Hudson, an Englishman in the service of the Dutch East India company, entered New York harbor and went up the river to which his name has been given, exploring it beyond the mouth of the Mohawk. The region thus discovered was claimed by Holland and named New Netherland; and in a few years trading posts were erected at Fort Orange (now Albany) and on Manhattan island. In 1623 permanent settlements were made at Fort Orange and at New Amsterdam on Manhattan island, on the present site of the city of New York. The Dutch settlements gradually spread up the river, and eastward to the Connecticut, and westward and southward to the Delaware. On the Delaware they came in collision with the Swedes, who had settled there in 1638 and occupied both banks nearly to the site of Philadelphia, and named their settlements New Sweden. They were finally expelled in 1655 by a Dutch army. The English claimed the whole country under the right given by Cabot's discovery, and, after much diplomatic controversy protracted through nearly half a century, at length ended the contest by seizing New Amsterdam in 1664, and with it the whole of New Netherland. The province in the same year had been granted by Charles II. to his brother the duke of York and Albany, in whose honor the name of New Amsterdam was changed to New York, which also became the name of the province, while Fort Orange became Albany. New Jersey at this time acquired its distinctive name from Sir George Carteret, who had been governor of the island of Jersey, and in conjunction with Lord Berkeley had purchased the territory from the duke of York and made it a separate colony. In 1681 the territory west of the Delaware was granted to William Penn, who colonized it chiefly with Friends or Quakers, and founded Philadelphia in 1682. Pennsylvania soon became one of the most flourishing of the colonies, and was honorably distinguished among them for the kindness and justice of its treatment of the Indians, and its consequent exemption for nearly a century from savage warfare. About 1730 a large immigration of Germans began, which peopled several counties and gave a peculiar character to the population of the province. The country between the southern line of Pennsylvania and the Potomac was early called Maryland, in honor of Henrietta Maria, queen of Charles I. The first settlement within its limits was made in 1631 by Capt. William Clayborne, with a party of men from Virginia, on Kent island in Chesapeake bay. In 1632 Charles I. granted the province by a charter to Cecilius Calvert, Lord Baltimore, who sent out in 1633 a colony of about 200 persons, nearly all of them Roman Catholic gentlemen and their servants, led by the brother of the lord proprietor, Leonard Calvert, who became the first governor of the province. They landed on St. Mary's river, March 27, 1634, and began a settlement. In 1649 the assembly passed the memorable act by which Christians of all sects were secured in the public profession of their faith, and allowed to worship God according to the dictates of their own consciences. The first permanent settlement in North Carolina appears to have been made about 1663, on Albemarle sound, by emigrants from Virginia. The first permanent settlement in South Carolina was made in 1670 by colonists from England on the Ashley river, near the site of Charleston, which began to be settled about the same time. The territory S. of Virginia had been granted in 1663 by Charles II., under the name of Carolina, to Clarendon, Monk, and others as proprietaries. A constitution for the government of the country, framed by the philosopher Locke, was adopted by the proprietaries in 1670; but, being impracticable, it never completely went into operation, and was abrogated in 1693. In 1729 the king bought out the proprietors and divided the colony into two, called respectively North and South Carolina. The present state of Georgia originally formed part of Carolina, but in 1732 George II., in honor of whom it was named, granted the territory to a corporation entitled "the trustees for settling the colony of Georgia." In the same year a colony of about 120 persons sailed for the new province, under the direction of Gen. James Oglethorpe, and in February, 1733, founded Savannah.—In the course of little more than a century from the settlement of Jamestown, 13 permanent colonies were thus founded by the English within the present limits of the United States. Within the same limits the Spaniards had also settled in Florida and New Mexico, and the French had established posts in Michigan, in Illinois, and in Louisiana near the mouth of the Mississippi. Though agriculture was the chief pursuit of the colonists, manufactures and commerce were not wholly neglected. But as early as 1660 the mother country began to hamper their trade with navigation acts designed to compel the commerce of the Americans to pass exclusively through English hands. The house of commons in 1719 declared "that the erecting of manufactories in the colonies tended to lessen their dependence upon Great Britain," and laws were accordingly enacted prohibiting or restricting manufactures. Prompt attention was paid to education. Provision was made for a school in Virginia in 1621, and in 1692–'3 William and Mary college was established at Williamsburg. A school was founded in New Amsterdam in 1633. Harvard college in Massachusetts was founded in 1636, and Yale college in Connecticut in 1700; the college of New Jersey was incorporated in 1746, and King's (now Columbia) college in New York in 1754. In the New England colonies, as soon almost as they were founded, laws were enacted providing for a liberal system of common schools.—The details of colonial history being given in this work under the names of the individual states, we shall only notice here the most prominent events of general interest, which may be classed under the three heads of Indian wars, French wars, and political struggles against the English government. The Indians at first received the whites as friends; but the steady encroachments of the settlers on their hunting grounds and other causes led at length to war, though to the last a few tribes continued faithful friends to the Europeans. The first serious encounter took place in 1622, after the death of the friendly Powhatan, when a general conspiracy of the Indians of Virginia broke out in a bloody massacre, in which in one hour about 350 of the English fell beneath the tomahawk. The colonists were victorious in this contest, and again in 1644–'6, when the Virginian tribes made their last struggle for independence, led by Opechancanough, who was captured and kept in prison till he died. In 1636 the powerful Pequot tribe began hostilities in Connecticut, which resulted in its destruction in 1637 by Massachusetts and Connecticut troops. In 1675 the famous Pometacom, sachem of the Wampanoags, or King Philip as he was called by the English, effected a general combination of the aborigines against the colonists. A terribly destructive war ensued, which for some months threatened the extermination of the European population of New England, but was finally ended by the defeat and death of Philip in 1676. The Carolinas became involved in a fierce and sanguinary struggle with the Corees and Tuscaroras in 1711, and with the Yemassees in 1715, in both of which the whites were victorious. Toward the close of the 17th century the hostile Indians on the northern and western frontiers began to receive powerful aid and encouragement from the French in Canada, who, whenever their mother country was at war with England, carried on hostilities with the English colonies, and frequently, accompanied by their savage allies, made destructive inroads into New England and New York. In one of these incursions, in 1689, Dover in New Hampshire was burned by the Indians, and the inhabitants were killed or carried away captive; and in 1690 a similar fate was inflicted on Schenectady in New York, by a party from Montreal. A few years later (1704–'8) Deerfield and Haverhill in Massachusetts were destroyed, with hundreds of men, women, and children, by bands led by Hertel de Rouville, a French officer. Father Marquette, Louis Joliet, Robert Cavelier de la Salle, and other missionaries and adventurers, had carried the cross and the standards of France through the wilderness, from the St. Lawrence and the great lakes to the Mississippi and the gulf; and gradually the English settlements on the Atlantic were flanked on their western side by a chain of French posts. This threatening lodgment of the French in the rear of their American colonies greatly excited the jealousy of the English, who, under the charters granted by James I., claimed dominion westward from the Atlantic to the Pacific, south of the latitude of the north shore of Lake Erie, while the French claimed all the territory watered by the Mississippi and its tributaries under the more plausible title of having made the first explorations and settlements. But the earliest conflict between the two nations in America arose not from any colonial quarrel, but from the revolution of 1688, and is known as King William's war. It lasted seven years, and during its continuance the colonies suffered exceedingly from the incursions of the French and their Indian allies. In retaliation for these attacks efforts were made by the colonists to conquer Canada, against which in 1690 two expeditions were sent, one from Massachusetts under Sir William Phips, and another from Connecticut and New York under Gen. Winthrop, neither of which accomplished anything of importance. The war was terminated by the treaty of Ryswick, Sept. 20, 1697, but peace was not long maintained. The war of the Spanish succession involved in its hostilities the French and English in America (1702), where the contest is known as Queen Anne's war. Its effects were chiefly felt in New England, whose whole western frontier was ravaged by the Indians to such an extent that most of the remote settlements were destroyed or abandoned. In 1707 an ineffectual attack was made upon the French colony of Acadia; but in 1710 an expedition from Boston conquered it and annexed it to the English empire, under which it received the name of Nova Scotia. In 1711 a powerful armament of English and New England troops, under Sir Hovenden Walker, attempted the conquest of Canada by sea, but failed, as did another expedition which at the same time marched from Albany to attack Montreal. The peace of Utrecht (April 11, 1713) terminated hostilities, which were not resumed for 30 years. At the expiration of that period the war of the Austrian succession broke out in Europe, and spread to America, where it is known as King George's war. Its principal event was the capture of Louisburg, the chief stronghold of the French in America, which was taken June 17, 1745, by a force from New England led by William Pepperell, a wealthy merchant of Maine. This exploit excited much enthusiasm in England as well as in the colonies, and gave the Americans an idea of their own military strength which had an important influence in the future. The war ended by the treaty of Aix-la-Chapelle, Oct. 18, 1748, and Louisburg was restored to the French. Disputes having arisen with the French on the Ohio, an expedition under Washington was sent toward that river, which on May 28, 1754, cut to pieces a French detachment under Jumonville, who was slain. This affair began the long contest known in America as the French and Indian war (nearly simultaneous with the seven years' war in Europe). Hostilities were waged in America for two years before war was formally declared between France and England. In 1755 four expeditions were undertaken against the French. Gen. Braddock, with a force of regulars and provincials, the latter commanded by Washington, proceeded against Fort Duquesne on the Ohio; but about 10 m. from that post he fell into an ambush, and was defeated and mortally wounded. The army was withdrawn from danger chiefly by the steadiness and skill of Washington and his provincials, who covered the retreat. The result of this expedition shook the confidence of the people in the prowess of the British soldiery, and gave Washington a hold on popular esteem and confidence which was never afterward shaken. An expedition against Niagara and Frontenac on Lake Ontario, commanded by Gov. Shirley of Massachusetts, also failed. An attack on the French posts near the head of the bay of Fundy, led by Gen. Winslow, a New Englander, resulted in their capture and the expulsion of the French inhabitants from Acadia. The fourth expedition, composed chiefly of New England troops, was led by Sir William Johnson against Crown Point. It encountered the enemy at the head of Lake George, and in one day, Sept. 8, suffered a repulse and gained a complete victory, in which the French commander Dieskau was incurably wounded and made prisoner. Johnson failed to follow up this success, and the campaign of 1755 ended on the whole more favorably for the French than for the English. The energy and ability of the marquis de Montcalm, who succeeded Dieskau as commander-in-chief in Canada, gave during the next two years a still more marked superiority to the French arms. Oswego, with an immense amount of military stores, was captured by them in 1756; and Fort William Henry, at the head of Lake George, was compelled to surrender in 1757, an event long remembered from the massacre of part of the garrison after the capitulation by Montcalm's Indian allies. In 1758 the current of affairs, under the management of the new English premier William Pitt, was reversed. Louisburg was taken after a siege of seven weeks by Generals Amherst and Wolfe; Fort Frontenac was captured by Col. Bradstreet, with a provincial force; and Fort Duquesne met the same fate from an expedition of which Washington was one of the commanders. These advantages, however, barely counterbalanced the repulse of an attack on Ticonderoga made by a powerful army under Gen. Abercrombie and Lord Howe, in which the latter officer fell at the head of his troops, while the former was obliged to retreat with a loss of 2,000 men. Abercrombie was promptly superseded by Amherst, before whose approach in 1759 the French fled from Ticonderoga and Crown Point without striking a blow. Almost at the same time Niagara was taken by Sir William Johnson, and a large force sent to its relief was completely routed. The crowning exploit of the campaign and of the war was the taking of Quebec by an army led by Gen. Wolfe, after a battle on the plains of Abraham (Sept. 13), in which both Wolfe and Montcalm were mortally wounded. The surrender of Quebec virtually decided the contest in America, though it continued in Europe and on the ocean till 1763, when by the treaty of Paris Canada and its dependencies were formally ceded to Great Britain. The transfer from the French to the English of the posts between the great lakes and the Ohio led to a war with the Indian tribes, of which the master spirit was Pontiac. It broke out in May, 1763, and lasted several years. Detroit was besieged, and many posts were captured and their garrisons put to death. (See PONTIAC.)—The termination of this war left the colonies poor and exhausted, for their contributions in men and money had been very large, and they had suffered severely from the enemy during the mismanagement of the first half of the contest. Nevertheless they had gained greatly by the struggle. The conquest of Canada, of Louisburg, and of the military posts on their western frontier, extinguished their chief source of anxiety and danger, and freed them for ever from any serious dread of the Indians, who were really formidable only when supported by the French. Then, too, the incapacity of the English generals and the defeats sustained by large bodies of English troops had materially weakened their superstitious reverence for the power of the mother country, while their own exploits in the war had given them a confidence in their strength hitherto unfelt. The general characteristics of the people were intelligence, industry, and a high degree of moral and religious culture. They were descended for the most part from intelligent and enterprising ancestors, who had emigrated from the old world either to secure to themselves greater freedom to worship God or better opportunities to acquire competence or wealth. The passage across the Atlantic was tedious and expensive, and life in the new settlements hard and perilous. The lazy, the timid, the improvident, the brutally ignorant, shrank from the terrors of the sea and the wilderness, and the vast majority of the emigrants were of the respectable and energetic middle class. Religious influences operated powerfully, not only in giving an impulse to emigration, but on the character of the emigrants in their new homes; and not only on the Puritans, Huguenots, and Quakers, who came avowedly from the highest motives, but on vast bodies of churchmen, Dutch Calvinists, and Scotch-Irish Presbyterians. Much care was devoted to the education of children, and especially to training them in a knowledge of the Bible and the catechism, and in reverence for the sabbath. In Virginia the laws enacted that in every settlement there should be "a house for the worship of God." Absence from church was punished by a fine, and travelling or shooting on the sabbath was forbidden. In the Carolinas there were similar laws, and in Pennsylvania acts were passed against "stage plays, playing of cards, dice, May games, masques, and balls." Similar also was the legislation of the New England colonies, where in addition at some periods sumptuary laws and laws regulating the use of tobacco were in force. The spirit of political freedom was strongly developed among the colonists, and republican ideas and feelings transmitted from the period of the commonwealth in England were widely diffused, though at the same time a warm attachment existed for the mother country and a devoted loyalty to the crown. This attachment was disinterested, for though England afforded protection during the wars with the French, these wars, with the single exception of that recently concluded, had originated in Europe, and were waged for objects with which America had neither concern nor sympathy. In many other respects the connection was injurious to the colonies. Their trade and manufactures were systematically restricted for the selfish benefit of England; but though these oppressive enactments were heavily felt by the colonists, they made no resistance so long as the imperial authority confined itself to measures which, however harsh or injurious, were not clearly unconstitutional. But in 1761 parliament authorized sheriffs and officers of the customs to use "writs of assistance" or general search warrants which empowered them to enter stores and private dwellings and search for merchandise which it was suspected had not paid duty. These writs were first used in Massachusetts, where they roused great excitement and opposition. Obedience was refused to them on the ground of illegality, and a trial ensued in which the eloquent James Otis, the advocate general of the crown, refused to defend them, but resigned his office and appeared in behalf of the people. His speech made a profound impression. The judges evaded a decision, and the writs, although secretly granted, were never executed. In Virginia two years later occurred a collision between the royal prerogative and the colonial legislation on the subject of dues to the clergy, in which the cause of the colony was defended by Patrick Henry. It was at length decided in England to tax the colonies directly in spite of all their protests, and the stamp act passed the house of commons on Feb. 27, 1765, and the house of lords on March 8, and received the royal assent on March 22. This act declared that every document used in trade or legal proceedings, to be valid, must have affixed to it a stamp, the lowest in value costing a shilling, and the duty increasing indefinitely in proportion to the value of the writing. To enforce the act, against which while it was under discussion the colonies had vehemently remonstrated, parliament authorized the ministry to send as many troops as they saw proper to America, for whom the colonies were required to find "quarters, fuel, cider or rum, candles, and other necessaries." These acts created great excitement and indignation in America. The Virginia assembly passed resolutions, introduced by Patrick Henry, declaring that the general assembly of that colony possessed the sole right and power to lay taxes on its inhabitants. The legislature of Massachusetts resolved that the courts should conduct their business without the use of stamps. In New York and Pennsylvania the opposition, though not so general, was yet very strong. Everywhere the people determined not to use the stamps, and associations calling themselves "sons of liberty" were organized in opposition to the act and for the general defence of the rights of the colonies. So powerful were these combinations, and so intense the popular indignation, that when the day came (Nov. 1) on which the obnoxious law was to go into effect, it was found that all the stamp distributors had resigned their offices. Meantime in June the Massachusetts legislature issued a circular inviting all the colonies to send delegates to a congress at New York on the first Tuesday of October. On that day delegates from nine of the colonies appeared. The congress drew up a declaration of rights, a memorial to parliament, and a petition to the king, in which they claimed the right of being taxed only by their own representatives; and these proceedings were approved by the colonial assemblies. The merchants of the principal cities agreed to purchase no more goods in England till the act was repealed, and the people pledged themselves to use no articles of English manufacture. These demonstrations of popular feeling in America led to the repeal of the stamp act on March 18, 1766, an event celebrated with great rejoicings both in the colonies and in the English seaports, whose trade was already seriously affected. But the plan of taxing America was not yet given up, and in June, 1767, parliament passed an act imposing duties on paper, glass, tea, and some other articles imported into the colonies. The colonies in return revived with renewed vigor their non-importation associations. Massachusetts, and especially the town of Boston, was foremost in the opposition; and in Boston, on the occasion of the seizure (June 10, 1768) of a sloop belonging to John Hancock for an alleged false entry, a disturbance occurred, which the commissioners of customs made the pretext for retiring to a vessel of war in the harbor. The government resolved to take vengeance on "the insolent town of Boston," and a military force under Gen. Gage was sent to occupy the place in September. A collision took place March 5, 1770, between the soldiers and a crowd of citizens, in which three of the latter were killed and eight wounded. This "Boston massacre," as it was called, caused great excitement throughout the country, and had much influence in heightening the popular feeling against England. The non-importation associations soon produced such an effect in England, that in April, 1770, the government removed all the duties except that of threepence a pound on tea, which was retained at the express command of George III., who said that "there should be always one tax, at least, to keep up the right of taxing." This did not satisfy the Americans, who objected not to the amount of the taxes, but to the principle of taxation without representation; and combinations were formed against the importation and use of tea, and measures taken to prevent its being either landed or sold. At Boston, on the evening of Dec. 16, 1773, a band of men disguised as Indians went on board three tea ships, which had recently arrived from England and lay at one of the wharves, and, taking out the chests, emptied the tea into the water, and then quietly retired. When the news of this action reached England, the government determined to punish the colonies, and especially to make an example of Boston. Parliament accordingly, in March, 1774, passed the "Boston port bill," which closed that port to all commerce, and transferred the board of customs to Marblehead and the seat of colonial government to Salem. Bills were also passed abrogating the most popular features of the colonial charter, and authorizing the commander to quarter his army in towns, and to transfer to another colony or to Great Britain any persons informed against or indicted for crimes committed in supporting the revenue laws or suppressing riots. These acts excited to a still greater pitch the already deep indignation of the people. Boston was everywhere regarded as the champion of popular rights, and as the victim of ministerial persecution; and money and provisions were sent to it from the most distant colonies and from England. Hutchinson was superseded as governor of Massachusetts in May, 1774, by Gen. Gage. Meanwhile conventions were held and delegates chosen to the congress at Philadelphia, known as the "old continental congress," which met Sept. 5 in Carpenters' hall, all the colonies being represented except Georgia and North Carolina; but delegates from the latter arrived on the 14th. Among the 53 members were Washington, Patrick Henry, Richard Henry Lee, Edward and John Rutledge, Christopher Gadsden, Samuel Adams, John Adams, Roger Sherman, Philip Livingston, William Livingston, and John Jay. Peyton Randolph of Virginia (succeeded by Henry Middleton of South Carolina on Oct. 22) was chosen speaker, and Charles Thomson of Pennsylvania secretary. The discussions were opened on the second day by Patrick Henry in a speech of surpassing eloquence, in which he said: "British oppression has effaced the boundaries of the several colonies; the distinctions between Virginians, Pennsylvanians, New Yorkers, and New Englanders are no more. I am not a Virginian, but an American." A declaration of rights was agreed upon, in which was set forth the claim of the colonists as British subjects to participate in making their own laws and in imposing their own taxes, to the right of trial by a jury of the vicinage, of holding public meetings, and of petitioning for redress of grievances. The maintenance of a standing army in the colonies without their consent was protested against, as were eleven acts passed since the accession of George III. in violation of colonial rights and privileges. The measures of redress which they proposed were peaceable, and comprised the formation of an "American association," pledged not to trade with Great Britain or the West Indies, nor with those engaged in the slave trade, and not to use British goods or tea. Among the papers issued by them were a petition to the king and an address to the people of Canada, written by John Dickinson of Pennsylvania; an address to the people of Great Britain, by John Jay; and a memorial to the people of the colonies, by Richard Henry Lee. The congress adjourned on Oct. 26, after providing for another congress to meet the following May, in case redress of grievances should not meanwhile be obtained. Perceiving a conflict to be almost inevitable, the people of the colonies began to prepare earnestly for war, and in Massachusetts nearly all men able to bear arms were trained daily in military exercises, and engaged to take the field at a moment's notice, whence originated their name of "minute men." Gen. Gage began to fortify Boston neck, and to seize arms and ammunition in the surrounding towns. Small stores of these had been accumulated by the provincial government of Massachusetts at Worcester and at Concord. Gage, on the night of April 18, 1775, secretly despatched a large force to destroy the stores at Concord. The movements of the British were vigilantly watched, and the minute men were roused in every direction. At Lexington, half way between Boston and Concord, on the following morning, the first blood of the revolution was shed. Major Pitcairn ordered the soldiers to fire upon the citizens who appeared in arms upon the common, and eight were killed and nine wounded. The British proceeded to Concord, and destroyed some stores, but met with such resistance at the north bridge over Concord river that they were forced to retreat, and, hotly pursued by the Americans, made their way back to Boston with a loss of 273 killed, wounded, and missing. The entire loss of the Americans during the day was 49 killed, 34 wounded, and 5 missing. This action brought the political contest between the colonies and England to a summary ending, and inaugurated the war of the revolution. The tidings of the fight spread with wonderful rapidity while it was going on, and everywhere throughout New England the people sprang to arms; and on the night of the day following the action the king's governor and army found themselves closely beleaguered in Boston. The provincial congress of Massachusetts on April 22 resolved unanimously that a New England army of 30,000 men should be raised, of which the quota of Massachusetts should be 13,600. As the news from Lexington and Concord spread westward and southward, the people everywhere rose in arms, and before the close of summer the power of all the royal governors from Massachusetts to Georgia was at an end. Volunteer expeditions from Vermont and Connecticut, led by Ethan Allen and Benedict Arnold, seized the important fortresses of Ticonderoga (May 10) and Crown point (May 12), whose cannon and ammunition were of incalculable value to the poorly equipped forces of America. In North Carolina a convention assembled at Charlotte, Mecklenburg co., in May, proclaimed their constituents absolved from all allegiance to the British crown, and organized a local government with preparations for military defence. The second continental congress assembled on May 10 at Philadelphia, in the state house, now known as Independence hall. Among the members were Franklin, Hancock, Samuel Adams, John Adams, Washington, Richard Henry Lee, Patrick Henry, Jay, George Clinton, and Robert R. Livingston. Hancock, who with Samuel Adams had been proscribed as a rebel, was elected president on May 24, Peyton Randolph vacating the chair to attend the Virginia legislature. Conservative and moderate to the last, the congress sent still another petition to the king, denying any intention of separation from England, and asking only for redress of grievances. But they took measures to raise an army, to equip a navy, and to procure arms and ammunition. The forces before Boston were adopted as the continental army, and at the suggestion of the New England members Washington was nominated and unanimously chosen (June 15) as commander-in-chief. Before he could reach the seat of war the battle of Bunker Hill had been fought, June 17. (See Bunker Hill.) Four days later he arrived, and on July 3 assumed command of the army in Cambridge. Charles Lee, Philip Schuyler of New York, Artemas Ward of Massachusetts, and Israel Putnam of Connecticut had been elected major generals. Horatio Gates (adjutant general), Seth Pomeroy, Richard Montgomery, David Wooster, William Heath, Joseph Spencer, John Thomas, John Sullivan, and Nathanael Greene were chosen brigadiers. The army was unorganized, undisciplined, poorly clad, imperfectly armed, and almost destitute of powder. With the aid of Gates, who almost alone of the generals had had much experience in war, Washington brought the troops into tolerable order, and regularly beleaguered Boston till March 17, 1776, when the British evacuated the city and sailed for Halifax, carrying with them a large body of loyalists. Meantime an invasion of Canada, whose inhabitants were reported to be disaffected to British rule, was decided upon by congress, and carried out with insufficient forces under command of Gen. Montgomery. Montreal was taken, and Quebec was attacked Dec. 31, 1775, by parties led by Montgomery and Arnold. The assault was conducted with great courage and energy, but was repulsed, and Montgomery was slain and Arnold severely wounded. After a blockade of the city continued for some months, the Americans, whose forces were totally inadequate in numbers and equipment to the enterprise, on the arrival of powerful reënforcements to the British, abandoned the province in June, 1776. On June 28 a British fleet made an attack on Charleston, S. C., where they were repulsed with great loss by a small force in Fort Sullivan (afterward Fort Moultrie), commanded by Col. Moultrie. In all these operations the Americans were greatly impeded by want of powder and other munitions of war. Cruisers were fitted out by order of congress and by some of the colonies, and several of the British supply ships were captured. Congress also appointed a naval committee with authority to build 13 frigates. A secret committee appointed to correspond privately with the friends of the colonies in Europe may be regarded as the germ of the state department. A financial committee and a war committee had already been instituted, and thus the main departments of the government of the united colonies were put in operation. The success of the colonial armies at Boston and at Charleston, and the outrages committed by British commanders on the coast and in Virginia, greatly stimulated the feeling in favor of independence, which Samuel Adams and a few others had desired from the beginning of the contest; and a powerful impulse was given to this sentiment by Thomas Paine's "Common Sense," which was issued about the beginning of 1776 and widely circulated. On June 7 Richard Henry Lee introduced a resolution into congress declaring "That these united colonies are, and of right ought to be, free and independent states; that they are absolved from all allegiance to the British crown, and that all political connection between them and the state of Great Britain is, and ought to be, totally dissolved." This was adopted on July 2 by the vote of twelve colonies, the delegates from New York, pending the decision of the question by the people of that colony, not voting. On the 4th the Declaration of Independence, written by Jefferson, setting forth the reasons for the separation, was adopted by the same vote, and in this document the colonies were first designated the "United States of America." On the same day it was authenticated by the president and secretary of congress, and published, but it was not then signed by the members. Having been engrossed on parchment, it was signed on Aug. 2 by 54 delegates, and subsequently by two others, 56 in all, representing all the thirteen colonies, the New York convention having approved the act on July 9. The text of the declaration is as follows:

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and to assume among the powers of the earth the separate and equal station to which the laws of nature and of nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident: That all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness. That to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that whenever any form of government becomes destructive of these ends, it is the right of the people to alter or to abolish it, and to institute a new government, laying its foundation on such principles, and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and accordingly, all experience hath shown that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security. Such has been the patient sufferance of these colonies, and such is now the necessity which constrains them to alter their former systems of government. The history of the present king of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute tyranny over these states. To prove this, let facts be submitted to a candid world:

He has refused his assent to laws the most wholesome and necessary for the public good.

He has forbidden his governors to pass laws of immediate and pressing importance, unless suspended in their operation till his assent should be obtained; and, when so suspended, he has utterly neglected to attend to them.

He has refused to pass other laws for the accommodation of large districts of people, unless those people would relinquish the right of representation in the legislature; a right inestimable to them, and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public records, for the sole purpose of fatiguing them into compliance with his measures.

He has dissolved representative houses repeatedly, for opposing with manly firmness his invasions on the rights of the people.

He has refused, for a long time after such dissolutions, to cause others to be elected; whereby the legislative powers, incapable of annihilation, have returned to the people at large for their exercise; the state remaining, in the mean time, exposed to all the danger of invasion from without and convulsions within.

He has endeavored to prevent the population of these states; for that purpose obstructing the laws for naturalization of foreigners, refusing to pass others to encourage their migration hither, and raising the conditions of new appropriations of lands.

He has obstructed the administration of justice, by refusing his assent to laws for establishing judiciary powers.

He has made judges dependent on his will alone for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of new offices, and sent hither swarms of officers to harass our people and eat out their substance.

He has kept among us, in times of peace, standing armies, without the consent of our legislatures.

He has affected to render the military independent of, and superior to, the civil power.

He has combined with others to subject us to a jurisdiction foreign to our constitution and unacknowledged by our laws, giving his assent to their acts of pretended legislation—

For quartering large bodies of armed troops among us;

For protecting them, by a mock trial, from punishment for any murders which they should commit on the inhabitants of these states;

For cutting off our trade with all parts of the world;

For imposing taxes on us without our consent;

For depriving us, in many cases, of the benefits of trial by jury;

For transporting us beyond seas to be tried for pretended offences;

For abolishing the free system of English laws in a neighboring province, establishing therein an arbitrary government, and enlarging its boundaries, so as to render it at once an example and fit instrument for introducing the same absolute rule into these colonies;

For taking away our charters, abolishing our most valuable laws, and altering, fundamentally, the powers of our governments;

For suspending our own legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated government here, by declaring us out of his protection and waging war against us.

He has plundered our seas, ravaged our coasts, burned our towns, and destroyed the lives of our people.

He is at this time transporting large armies of foreign mercenaries, to complete the works of death, desolation, and tyranny, already begun with circumstances of cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the head of a civilized nation.

He has constrained our fellow citizens, taken captive on the high seas, to bear arms against their country, to become the executioners of their friends and brethren, or to fall themselves by their hands.

He has excited domestic insurrections amongst us, and has endeavored to bring on the inhabitants of our frontiers the merciless Indian savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes, and conditions.

In every stage of these oppressions, we have petitioned for redress in the most humble terms. Our repeated petitions have been answered only by repeated injury. A prince,

> whose character is thus marked by every act which may define a tyrant, is unfit to be the ruler of a free people.
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> Nor have we been wanting in attention to our British brethren. We have warned them, from time to time, of attempts made by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them, by the ties of our common kindred, to disavow these usurpations, which would inevitably interrupt our connections and correspondence. They, too, have been deaf to the voice of justice and consanguinity. We must, therefore, acquiesce in the necessity which denounces our separation, and hold them, as we hold the rest of mankind, enemies in war, in peace friends.
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> We, therefore, the representatives of the United States of America, in general congress assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the name and by the authority of the good people of these colonies, solemnly publish and declare that these united colonies are, and of right ought to be, free and independent states; that they are absolved from all allegiance to the British crown, and that all political connection between them and the state of Great Britain is, and ought to be, totally dissolved; and that, as free and independent states, they have full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent states may of right do. And for the support of this declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other our lives, our fortunes, and our sacred honor.

"The declaration was not only the announcement of the birth of a people," says Bancroft, "but the establishment of a national government; a most imperfect one, it is true, but still a government, in conformity with the limited constituent powers which each colony had conferred upon its delegates in congress. The affairs of internal police and government were carefully retained by each separate state, which could, each for itself, enter upon the career of domestic reforms. But the states, which were henceforth independent of Britain, were not independent of one another; the United States of America assumed powers over war, peace, foreign alliances, and commerce." Soon after the evacuation of Boston by the British, Washington had transferred his army to the city of New York. On June 29 a fleet from Halifax, bearing Gen. Howe and the late garrison of Boston, entered New York harbor, and on July 2 landed the forces on Staten Island. A few days later arrived Admiral Lord Howe, to whom, in conjunction with his brother Sir William, the king had intrusted the control of American affairs. The British government, unable to recruit the army to the desired number from its own people, who disapproved the war, had hired from German princes, and especially from Hesse-Cassel, large bodies of mercenaries; and with these and fresh troops brought from the south by Sir Henry Clinton, the force on Staten Island was augmented to 30,000 men. Washington's army was much less in numbers, and every way inferior in supplies and equipments. The campaign began on Long Island, where on Aug. 27 the Americans were defeated with heavy loss, and forced to abandon that island, and soon after the city of New York. Having fought another unsuccessful battle at White Plains (Oct. 28), Washington early in December was compelled to retreat beyond the Delaware at the head of but 3,000 men, poorly clad, half starved, and destitute of blankets and tents. About the same time the British seized and held the island of Rhode Island, and at Baskingridge, N. J., captured Gen. Charles Lee. On the night of Dec. 25 Washington crossed the Delaware in open boats with 2,400 men, and falling upon the British forces at Trenton captured about 1,000 Hessians. A few days later (Jan. 3, 1777), he defeated the enemy again at Princeton, taking 230 prisoners. Soon after the army went into winter quarters at Morristown. When the campaign opened in the spring of 1777, Washington's force consisted of about 7,500 men. Gen. Howe, after vainly attempting to bring on a general engagement, withdrew his forces (June 30) from New Jersey to Staten Island, and afterward sailed with nearly 20,000 men for the Chesapeake, where he landed on Elk river and threatened Philadelphia. To defend the capital Washington was forced to give battle on the Brandywine, Sept. 11, but was outnumbered and compelled to retreat with the loss of nearly 1,000 men. Lafayette, who had recently entered the service of the United States as a volunteer, and had been made a major general, was severely wounded on this occasion. On the 26th the British took possession of Philadelphia without opposition. On Oct. 4 Washington made an attack on the British at Germantown, seven miles from Philadelphia, but was repulsed with heavy loss; and soon afterward both armies went into winter quarters, the Americans at Valley Forge, on the Schuylkill, 20 m. from Philadelphia. The want of success in this region was more than counterbalanced by victories in the north. A British army, 7,500 strong, besides Indians, commanded by Gen. Burgoyne, advanced from Canada by Lake Champlain, and took Ticonderoga, Fort Independence, and Whitehall. Strong detachments, which were sent to Bennington, Vt., to destroy a collection of stores, were met there (Aug. 16) and defeated with the loss of about 200 killed and 600 prisoners by the Vermont and New Hampshire militia led by Gen. Stark. Burgoyne advanced to Stillwater on the Hudson, where he was encountered by Gen. Gates; and on Sept. 19 an indecisive engagement was fought at that place, in which the British lost more than 600 men. The American encampment had been strongly fortified by Kosciuszko. On Oct. 7 a second battle (commonly called the battle of Saratoga) was fought on nearly the same ground, in which the Americans had the advantage; and ten days later Burgoyne with his whole army capitulated at Saratoga. The consequences of this victory were of the highest importance at home and abroad. On Dec. 1 Baron Steuben, a German officer, arrived in the country, and during the winter joined Washington at Valley Forge. He was afterward appointed inspector general, and was of great service in introducing discipline into the army. From the beginning of the conflict the French government had secretly encouraged the revolt of the colonies, and had furnished them with supplies of arms and military stores, without which it would have been almost impossible to carry on the war. Franklin, Silas Deane, and Arthur Lee had been sent by congress as commissioners to France shortly after the declaration of independence, but received no open countenance from the court till after the surrender of Burgoyne. That event decided the negotiations in their favor; and in February, 1778, treaties of alliance and of amity and commerce were signed at Paris. Sir Henry Clinton, who succeeded Howe as commander-in-chief of the British, evacuated Philadelphia in the night of June 17 with more than 17,000 men, and on the 18th began his march toward New York. Washington pursued, and on the 28th the two armies engaged in battle on the plains of Monmouth, near the village of Freehold, N. J. The action was not decisive, but the Americans remained masters of the field, while the British retreated to New York and remained inactive for the rest of the summer. On July 8 a French fleet from Toulon, under Count d'Estaing, anchored in Delaware bay, but too late to intercept the British squadron and transports retreating from Philadelphia. An attempt made in August with the assistance of the French fleet to drive the British from Rhode Island proved a failure, and d'Estaing, without having accomplished anything of importance, sailed in November for the West Indies. At the close of the campaign of 1778 the position of the British was not at all advanced from that which their forces held in 1776. They occupied nothing but Rhode Island and the island of Manhattan, while the Americans had gained largely in knowledge of the art of war, and had secured the powerful alliance of France. But great embarrassment was felt from the wretched condition of the national finances, the continental money issued by congress having depreciated to a very low point. In this emergency the patriotism and the financial skill and credit of Robert Morris were of the highest value. In 1779 the principal theatre of war was at the south, where Gen. Benjamin Lincoln commanded the Americans. Toward the end of 1778 Gen. Clinton had sent an expedition to Georgia, which defeated the American forces at Savannah, and took possession of the city, Dec. 29; and the colony was soon completely in the power of the British. In September, 1779, Savannah was besieged by a French and American force, and on Oct. 9 an assault was made upon it, which was repulsed with a loss to the allies of nearly 800 men, among them Casimir Pulaski. The siege was thereupon abandoned. About this time the British evacuated Rhode Island, to concentrate their forces at New York. Paul Jones, commanding an American frigate, captured on Sept. 23 two British ships of war in the English channel, in one of the most desperate naval battles ever fought. During the whole war in fact Paul Jones was actively employed against the enemy on the sea, and, together with a swarm of privateers from New England, inflicted immense loss on the mercantile marine of England. One of the most brilliant achievements of the war was the storming (July 16) of Stony Point on the Hudson by Gen. Wayne at the head of 1,200 men, taking 543 prisoners; only 15 of his men were killed, while the British killed numbered 63. About the beginning of 1780 Clinton, leaving the Hessian general Knyphausen in command at New York, sailed south with 8,500 men to carry the war into the Carolinas. Charleston was besieged for several weeks, and Gen. Lincoln after a feeble defence surrendered on May 12, the garrison becoming prisoners of war. The rest of the state of South Carolina was overrun by detachments of the British, and nominally submitted to the restoration of the royal authority, so that Clinton, deeming his conquest complete, sailed for New York on June 5, leaving Lord Cornwallis in command. But a guerilla warfare, under the command of Sumter, Marion, and other partisan leaders, continually harassed not only the British but the tories, as the American royalists were commonly called, of whom there were great numbers in the state. Congress sent Gen. Gates to recover South Carolina. On his first encounter with Cornwallis at Camden, Aug. 16, he was routed with great loss, Baron de Kalb, a French officer of experience, who was second in command, being mortally wounded. Gates with the remnant of his force fled to North Carolina. Within three months two American armies had been destroyed, while the most formidable of the partisan bands, that of Sumter, had been dispersed by Col. Tarleton. Early in September Cornwallis marched into North Carolina, where on Oct. 7, at King's mountain, a detachment from his army was totally defeated by 900 militia, who killed and captured upward of 1,100 of the enemy. This serious reverse, and the renewed activity of Marion, Sumter, and other partisan leaders, induced Cornwallis to withdraw to South Carolina. During the summer the only military operation of importance in the north was an unsuccessful irruption of the British into New Jersey. Soon after, on July 10, a French fleet arrived at Newport, bringing the count de Rochambeau and 6,000 soldiers. Washington went to Hartford in September to confer with the French officers, and during his absence it was discovered that Benedict Arnold, who commanded the important fortress of West Point, had agreed to deliver that stronghold and its dependencies into the hands of Sir Henry Clinton. Arnold escaped, but Major André, the British officer who communicated with him, was caught and hanged as a spy. The principal military operations of 1781 were in the south, where Greene had been made commander in place of Gates. At Cowpens, S. C., on Jan. 17, Gen. Morgan won a brilliant victory over the British under Col. Tarleton. On March 15, at Guilford Court House, N. C., a battle was fought in which the British gained the victory, but drew from it no advantage; and on Sept. 8 occurred the drawn battle of Eutaw Springs, a bloody action which nearly terminated the war in South Carolina. At the close of the year the British in the states south of Virginia were confined to Charleston and Savannah. Cornwallis, having advanced into Virginia in April, was opposed by Lafayette, Wayne, and Steuben, and fortified himself at Yorktown, where he gathered a considerable army. Meanwhile the American army under Washington and the French army of Rochambeau had formed a junction on the Hudson; and while the British commander, Sir Henry Clinton, was kept from sending aid to Cornwallis by apprehensions that New York was threatened, the allied army was far on its way toward Yorktown, where it arrived Sept. 28, 1781, and began a regular siege, which lasted till Oct. 19, when Cornwallis surrendered with his whole force of 7,247 men, besides 840 sailors; 106 guns were taken. This victory substantially terminated the contest, and secured the independence of America. The French contributed 37 ships (under De Grasse) and 7,000 men to the besieging force, and the Americans 9,000 men. In England Lord North and his administration were forced to retire, March 20, 1782, and were succeeded by a cabinet opposed to the further prosecution of the war, headed by the marquis of Rockingham. Orders were sent to the British commanders in America to cease hostilities, and in July, 1782, Savannah was evacuated, and Charleston on Dec. 14. Adams, Franklin, Jay, and Laurens on the part of the United States, and Strachey, Oswald, and Fitzherbert on the part of Great Britain, signed a preliminary treaty of peace at Paris on Nov. 30, 1782; and on Sept. 3, 1783, a definitive treaty was signed at Versailles, by which the United States were formally acknowledged by Great Britain to be free, sovereign, and independent. New York, the last position held by the British on our coast, was evacuated Nov. 25, 1783. In the seven years of the revolutionary war Great Britain sent to America about 112,000 soldiers and 22,000 seamen. The forces raised by the United States during the same period consisted of about 232,000 continental soldiers and 56,000 militia. On Nov. 2 Washington issued a farewell address to the armies of the United States, and, after taking leave on Dec. 4 of his officers at New York, proceeded to Annapolis, Md., where congress was then in session, and on Dec. 23 resigned his commission as commander-in-chief and retired to his estate at Mount Vernon.—The existence of the United States as a political entity may be dated from the assembling of the second continental congress, May 10, 1775, as the first assumed no political powers. From that date to March 1, 1781, when the articles of confederation were finally ratified, the government of the Union was revolutionary, the powers exercised by congress being assumed by that body and conceded by the states from the necessity of the situation. The period of the confederation extended to March 4, 1789, when the constitution went into effect. On June 12, 1776, while the resolution of independence was under consideration in congress, a committee of one from each colony was created to draft a form of confederation, and the articles reported by it were adopted, Nov. 15, 1777. They were ratified by South Carolina on Feb. 5, 1778, and by ten other states before the close of that year. Delaware ratified them on Feb. 1, 1779, and Maryland on Jan. 30, 1781; and, being signed by delegates from all the states, they went into effect as above stated. The delay of Maryland was caused by her refusal to join the confederation until those states claiming territory beyond their settled limits should cede it to the Union for the common benefit. Cessions having been made, an ordinance was passed by congress, July 13, 1787, for the government of the territory N. W. of the Ohio river, since famous as the ordinance of 1787. Dissatisfaction with the confederation, owing to the weakness of the central government under it, soon became widespread, and in September, 1786, a convention of delegates from several states at Annapolis, Md., recommended the calling of a convention of delegates from all the states to propose changes in the articles of confederation. This plan was approved by congress on Feb. 21, 1787, and the convention organized at Philadelphia on May 25, by the choice of Washington as president. It remained in session in Carpenters' hall until Sept. 17, when it adjourned after adopting the constitution. All the states were represented except Rhode Island. On the 28th congress passed a resolution transmitting the constitution to the several states to be acted upon by conventions. Delaware ratified it on Dec. 7, and ten other states prior to Sept. 13, 1788, when a resolution of congress declared it ratified by nine states (the constitution providing that when ratified by that number it should go into effect in the states ratifying), fixed the first Wednesday of January, 1789, for the choice of presidential electors in the several states, and the first Wednesday of February for the choice of president by the electors, and provided that the new government should go into operation on the first Wednesday of March. The second continental congress expired on March 4, 1789, having maintained its corporate identity for nearly 14 years, though changed from time to time in its membership. Its presidents, though without power or patronage, were regarded as the personal representatives of the sovereignty of the Union. The following are their names, with the date of their election: Peyton Randolph of Virginia, May 10, 1775; John Hancock of Massachusetts, May 24, 1775;

Henry Laurens of South Carolina, Nov. 1, 1777; John Jay of New York, Dec. 10, 1778; Samuel Huntington of Connecticut, Sept. 28, 1779; Thomas McKean of Delaware, July 10, 1781; John Hanson of Maryland, Nov. 5, 1781; Elias Boudinot of New Jersey, Nov. 4, 1782; Thomas Mifflin of Pennsylvania, Nov. 3, 1783; Richard Henry Lee of Virginia, Nov. 30, 1784; Nathaniel Gorham of Massachusetts, June 6, 1786; Arthur St. Clair of Pennsylvania, Feb. 2, 1787; Cyrus Griffin of Virginia, Jan. 22, 1788. The first congress under the constitution was long without a quorum; the house did not organize till March 30, 1789, nor the senate till April 6. The electoral votes were then counted, when Washington, having received the entire number (69), was declared elected president, and John Adams, who had received the next highest number (34), was declared elected vice president. Adams took his seat as president of the senate on April 21, and Washington was inaugurated in New York on April 30. The president appointed Jefferson secretary of state, Hamilton secretary of the treasury, Henry Knox of Massachusetts secretary of war, and Edmund Randolph of Virginia attorney general, those officers then constituting the whole of the cabinet. North Carolina ratified the constitution on Nov. 21, 1789, and Rhode Island on May 29, 1790, completing the list of the original states. Ten amendments in the nature of a bill of rights, suggested by the conventions in some of the states, and adopted by the first congress, became a part of the constitution in 1791. An eleventh amendment, taking from the federal courts jurisdiction of actions prosecuted against a state by citizens of another state, became operative in 1798, and a twelfth, changing the method of electing the president and vice president, in 1804. No further amendments were made for more than 60 years. The seat of government was removed to Washington in 1800, the first session of congress held there commencing on Nov. 17. The previous seats of government were as follows, the dates being those of the opening of sessions of congress: Philadelphia, May 10, 1775; Baltimore, Dec. 20, 1776; Philadelphia, March 4, 1777; Lancaster, Pa., Sept. 27, 1777; York, Pa., Sept. 30, 1777; Philadelphia, July 2, 1778; Princeton, N. J., June 30, 1783; Annapolis, Md., Nov. 26, 1783; Trenton, N. J., Nov. 1, 1784; New York, Jan. 11, 1785, where the constitutional government was organized in 1789; and Philadelphia, Dec. 6, 1790. The beneficial influence of the new government was immediately felt in the restoration of public confidence, the revival of commerce, and the general prosperity of the country. A system of finance, advocated in an able report by Hamilton, was adopted, and the debts of the late confederacy and of the individual states were assumed by the general government. A bank of the United States was incorporated in 1791, and a mint was established at Philadelphia in 1792. In the summer of 1790 an Indian war broke out with the tribes of the northwest, who, after inflicting defeats on Gens. Harmar and St. Clair, were finally quelled by Gen. Wayne, and peace was restored in August, 1795. The great revolution in France, which broke out at the beginning of Washington's administration, was powerfully felt in its principles and effects in this country. Two parties had already been formed: the federalists, composed of those who favored the maintenance of the constitution just as it was; and the republicans or democrats, who desired to introduce amendments to limit the federal power, and to increase that of the states and the people. Washington, Adams, Hamilton, and Jay were accounted among the federalists; while Jefferson, Madison, Gallatin, and Edward Livingston were among the leaders of the republicans. The federal party on the French question advocated a strict neutrality, while the republicans freely avowed their sympathy for France, and their willingness to aid the French republic in its struggle with the European monarchies. Party spirit ran high on this point, yet at the second presidential election in 1792 Washington again received the unanimous votes (132) of the electoral colleges. Adams was reelected vice president, receiving 77 votes, while George Clinton, the republican candidate, received 50 votes, and 5 were cast for others. The feeling against Great Britain existing since the revolution was strongly stimulated by the obnoxious conduct of the British government in retaining possession of forts in the west to which its title had been ceded by the treaty of 1783, and in seizing American vessels and impressing American seamen. After in vain remonstrating against these outrages, the president sent John Jay as a special envoy to England, where, in November, 1794, a treaty was concluded, which was regarded by the republicans as so favorable to England that the requisite confirmation by the senate was obtained with difficulty, and its promulgation among the people raised an extraordinary clamor against Jay and the president, which however soon subsided. In pursuance of this treaty the forts were surrendered in 1796. Its ratification exasperated the French government, which openly showed its displeasure by decrees under which American commerce suffered continual annoyances and losses. Among the important domestic events of Washington's administration were the admission into the Union of the new states of Vermont (1791), Kentucky (1792), and Tennessee (1796), and the whiskey insurrection against an unpopular excise law, which in 1794 threw western Pennsylvania into confusion, but was energetically suppressed by the president, who called out 15,000 militia. On the approach of the third presidential election, Washington positively declined to be a candidate, and the two great parties at once arrayed themselves against each other with a bitterness of zeal never since equalled. The federalists supported John Adams and the republicans Thomas Jefferson. Adams, who received 71 electoral votes, was chosen president, while Jefferson, who received 68, the next highest number, became, by the constitution as it then was, the vice president. The two next highest candidates were Thomas Pinckney and Aaron Burr. Timothy Pickering was made secretary of state, Oliver Wolcott of the treasury, James McHenry of war, and Charles Lee attorney general. In 1798 the navy department was created, and Benjamin Stoddert made secretary. The relations between France and the United States were so threatening that one of the first acts of President Adams was to convene congress in extra session, May 13, 1797. Three envoys, C. C. Pinckney, Elbridge Gerry, and John Marshall, were sent to France with authority to adjust all difficulties. The French government refused to receive them, but intimated that a considerable present of money would greatly facilitate negotiations, and that a refusal to pay the bribe would lead to war. "War be it then," replied Pinckney; "millions for defence, but not a cent for tribute." Pinckney and Marshall, who were federalists, were ordered to quit France; but Gerry, who was a republican, was allowed to remain. The insult to their envoys excited great indignation in the United States, and congress made preparations for war. The army and navy were enlarged, and Washington was appointed commander-in-chief, with the rank of lieutenant general. The frigate Constellation captured a French frigate in the West Indies, and disabled another of superior force in an action lasting five hours. The decided measures adopted by the United States were not without effect on the French government, and overtures were made to the president for a renewal of negotiations. A fresh embassy was sent, and, Napoleon Bonaparte having attained to power, a treaty was promptly concluded, Sept. 30, 1800. During these troubles with France two acts were passed by congress, known as the alien and sedition laws: the first, which was limited to two years, empowering the president to order aliens who were conspiring against the peace of the United States to quit the country; the other, which was to remain in force till March 4, 1801, providing among other things for the punishment by fine and imprisonment of seditious libels upon the government. The alien law was defended on the ground that the country swarmed with French and English emissaries, whose mission was to embroil the United States with European quarrels; while the apology for the sedition law was the unquestionable licentiousness of the press, which at that time was chiefly conducted by refugees and adventurers from Great Britain and Ireland. Nevertheless these laws became exceedingly unpopular, and were bitterly denounced as harsh and unconstitutional. They contributed largely to the dissatisfaction with Mr. Adams's administration, which prevailed especially in the south and west, and which led in the next presidential election to the success of the republican candidates, Jefferson and Burr, each of whom received 73 votes, while Mr. Adams received 65, C. C. Pinckney 64, and Jay 1. The tie in the votes for Jefferson and Burr threw the election into the house of representatives, where on the 36th ballot Jefferson was chosen president and Burr vice president. This contest led to the adoption of the twelfth amendment of the constitution, requiring the electors to designate which person is voted for as president and which as vice president, while the original article required them to vote for two persons, of whom the one who had the highest number of votes was to be president, and the next highest vice president. Jefferson's cabinet consisted of James Madison, secretary of state; Samuel Dexter, and afterward Albert Gallatin, of the treasury; Henry Dearborn, of war; Benjamin Stoddert, and afterward Robert Smith, of the navy; and Levi Lincoln, attorney general. For the most part his administration was marked by vigor and enlightened views, and in 1804 he was reelected for a second term, receiving 162 votes. George Clinton was elected vice president by the same vote. The opposition ticket, C. C. Pinckney of South Carolina and Rufus King of New York, received only 14 votes, those of Connecticut and Delaware and 2 from Maryland. During his first term Ohio was admitted (1802), and Louisiana was purchased of France in 1803. The insolence of the piratical states on the Barbary coast was humbled by the bombardment of Tripoli in 1804, and by the invasion of that state by a small force led from Egypt by Capt. Eaton, an American officer, which led to a satisfactory treaty in 1805. In 1806 Aaron Burr secretly organized, chiefly in the western states, a military expedition, which led to his arrest and trial at Richmond in 1807 on a charge of attempting to dismember the Union and to establish an independent dominion west of the Alleghanies; but no overt act being proved against him, he was acquitted. The amicable relations which had existed between the United States and Great Britain for several years began in the latter part of 1805 to be disturbed by the condemnation by British courts of several American vessels for alleged violations of neutrality; and the situation was aggravated by the operation of an order in council (May 16, 1806) of the British government declaring the whole coast of Europe, from the Elbe to Brest, to be in a state of blockade; an order which Napoleon retaliated by declaring in a decree issued at Berlin, Nov. 21, 1806, a blockade of all the ports of the British islands. Under these and other orders and decrees great numbers of American vessels were seized by French and English cruisers, and our foreign commerce, which had attained extraordinary prosperity from the neutral position of the country, was nearly destroyed. The irritation against Great Britain produced by her depredations on our commerce was greatly increased by her persistent assertion of the right to search American vessels for suspected deserters from her navy, a right continually exercised by her cruisers in the most offensive manner, and in the practice of which multitudes of native-born American seamen were forced into the British navy. The insolence of the British naval officers was at length carried so far that in June, 1807, the frigate Chesapeake was stopped near the entrance to Chesapeake bay by the English man-of-war Leopard, and on the refusal of her commander to submit to a search was fired into, and 21 of her crew were killed or wounded. This outrage, for which immediate reparation was demanded by Jefferson, was not atoned for till four years later, and even then the right of search was still claimed by the British government, and eventually became a cause of war. In February, 1806, an act had been passed prohibiting the importation of certain articles of British production, the first of a series of similar measures designed to bring Great Britain to terms. In December, 1807, congress, on the recommendation of the president, laid an embargo, which prohibited the departure from American ports of vessels bound for foreign countries. This measure was vehemently denounced by the federal party, and for a time it prostrated the shipping and commercial interests of the United States. It was repealed in February, 1809, just before the expiration of the president's second term. In the presidential election of 1808 the republican (or, as it was now often called, the democratic) party supported James Madison for president and George Clinton for vice president. Madison and Clinton were elected, the former receiving 122 votes and the latter 113, while the federal candidates, C. C. Pinckney and Rufus King, received each 47, a few votes being cast for other candidates. The ruinous operation of the embargo law had considerably weakened the democratic party, particularly in the commercial eastern and middle states. Mr. Madison formed his cabinet as follows: Robert Smith, secretary of state; Albert Gallatin, of the treasury; William Eustis, of war; Paul Hamilton, of the navy; and Cæsar A. Rodney, attorney general. Congress met in May, 1809, in extra session, and continued the non-importation system. A long negotiation was carried on with the English government on this subject, the orders in council, and the right of search, which resulted only in augmenting the unfriendly feeling between the two countries. Though the president was exceedingly averse to forcible measures, the pressure of public opinion, and the influence of Clay, Calhoun, Lowndes, and other leaders of the war party, at length induced him to acquiesce reluctantly in a declaration of hostilities. He sent to congress, June 1, 1812, a message on the subject of the aggressions of Great Britain, which was referred to the committee on foreign relations in the house of representatives, who on June 3 reported a manifesto as a basis of the declaration of war, for these reasons: the impressment of American seamen by the commanders of British ships of war; the British doctrine and system of blockade; the orders in council; and, lastly, various depredations committed by British subjects on the commerce of the United States. The house adopted the measure by a vote of 79 to 49, and the senate by a vote of 19 to 13; and on June 18 the president signed the act declaring war. For several months thereafter the British government did little toward counter hostilities. But although the United States had the advantage that the main force of their enemy was occupied by the great European conflict, their own preparation for the contest was in every respect inadequate. The treasury was almost empty, the revenue having been nearly ruined by the non-importation acts and embargoes; the army at first numbered but 10,000 men, half of them raw recruits, and was very deficient in officers of experience; while the navy comprised only eight frigates, two sloops, and five brigs. Long before war was declared British emissaries, as was alleged, had been engaged in exciting the northwestern Indians against the Americans; and in the summer of 1811 hostilities were actually begun by the tribes north of the Ohio under the lead of Tecumseh. William Henry Harrison, governor of Indiana territory, encountered them with a considerable force on the banks of the Tippecanoe river, Nov. 7, 1811, and defeated them. After the declaration of war, Gen. Hull, then governor of Michigan territory, was ordered to invade Canada from Detroit, which he accordingly did at the head of 1,800 men. His force was wholly inadequate to the enterprise, and he was soon compelled to fall back; and his men being reduced by various casualties to 800, on Aug. 16, 1812, he surrendered his army, Detroit, and all Michigan to Gen. Brock. An invasion of Canada on the Niagara frontier was almost equally unsuccessful, and the campaign of 1812 closed with little or no credit to the American arms on land. But the navy, small as it was, had achieved a series of brilliant victories. The frigate Constitution, Capt. Isaac Hull, captured the British frigate Guerriere, Aug. 19; the sloop of war Wasp, Capt. Jones, captured the brig Frolic, Oct. 18; the frigate United States, Capt. Decatur, captured the frigate Macedonian, Oct. 25; and the Constitution, of which Capt. Bainbridge had now taken command, captured the frigate Java, Dec. 29. In these contests the British loss in killed and wounded was vastly in excess of that of the Americans, and the result highly elated the public, with whom the navy hitherto had been in no special favor. A swarm of privateers scoured the ocean, preying upon British commerce to such an extent that their captures in this year alone amounted to more than 300 vessels. The campaign of 1813 was marked by alternate successes and reverses. In January a detachment of 900 men from the western army, under Gen. Winchester, was defeated and captured at the river Raisin, and many of the prisoners massacred by the Indian allies of the English. In April Gen. Pike with 1,600 Americans captured York (now Toronto), which was defended by 800 men, but was himself killed by the explosion of a magazine, by which 200 of his men were killed or wounded. In May an attack on Sackett's Harbor by the British under Gen. Prevost was repulsed by Gen. Brown, and Fort George in Canada was taken by the Americans. In October Gen. Harrison defeated the British, who had abandoned Detroit, near the Thames river in Canada, with severe loss, the Indian chief Tecumseh being among the slain. Attempts at an invasion of Canada from Lakes Ontario and Champlain, with a view to the capture of Montreal, came to nothing, partly through disagreement between Gens. Wilkinson and Hampton. The navy as usual was more successful than the army. On Lake Erie, Sept. 10, a British fleet of six vessels was captured after a severe contest by Commodore O. H. Perry, which rendered the Americans masters of the lake. On the ocean, the Hornet, Capt. Lawrence, captured the Peacock, Feb. 24; and the Enterprise, Lieut. Burroughs, captured the Boxer, Sept. 5. On the other hand, the frigate Chesapeake, commanded by Capt. Lawrence, was on June 1 captured by the British frigate Shannon, Capt. Broke. The campaign of 1814 was conducted with more vigor on both sides, and was marked by obstinate and sanguinary engagements on the Niagara frontier. On July 5 the British were defeated at Chippewa by Gen. Brown, and on the 25th at Bridgewater or Lundy's Lane by Gens. Brown and Winfield Scott, the latter of whom had also distinguished himself at Chippewa. The war in Europe having closed, large reënforcements, consisting of troops who had served under Wellington in Spain, were sent to Canada by the British government; and Sir George Prevost, at the head of 12,000 men, invaded New York on the northern frontier and laid siege to Plattsburgh, defended by Gen. Macomb. The army was supported by a powerful fleet on Lake Champlain, commanded by Commodore Downie. On Sept. 11 the United States fleet, under Commodore Macdonough, totally defeated the English fleet, and on the same day the British army retreated in disorder to Canada. In August a British fleet arrived in the Chesapeake with an army of 5,000 men commanded by Gen. Ross, who landed in the Patuxent and marched on Washington, and, after putting to flight the militia at Bladensburg, took possession of the federal city on the 24th, and burned the capitol, the president's house, and other public buildings. On the day after this barbarous exploit the British retired to their ships, and on Sept. 12–13 made an attack on Baltimore, where they were repulsed by the citizens, and Gen. Ross was killed. On the ocean during this year and the beginning of 1815 the British vessels of war Epervier, Avon, Reindeer, Cyane, Levant, Penguin, and Nautilus were taken by the Americans, who on their part lost the frigates Essex and President, both captured by greatly superior forces, besides two or three smaller vessels. After protracted negotiations a treaty of peace was signed at Ghent, Dec. 24, 1814, on the part of the United States, by Henry Clay, John Quincy Adams, Jonathan Russell, James A. Bayard, and Albert Gallatin. The treaty provided for the mutual restoration of all territory taken during the war, and for the mutual appointment of commissioners to determine the northern boundary of the United States. Nothing was said of the impressment of American seamen, one of the main causes of the war, but the practice was discontinued. Before the news of peace could cross the Atlantic, a British army 12,000 strong, led by Gens. Pakenham, Gibbs, Keene, and Lambert, landed on the coast of Louisiana and made an attack on New Orleans, which was defended by Gen. Andrew Jackson with less than 5,000 men, chiefly militia from Tennessee and Kentucky. The attack was repelled, Jan. 8, 1815, with a loss to the British of 2,000 killed, wounded, and prisoners, while the Americans lost only a few men. The war from its beginning had been distasteful to the majority of the people of New England, who, being mostly federalists, regarded it not only as unnecessary and impolitic, but as waged chiefly to gratify democratic prejudice against England and partiality for France. They suffered from it immense losses by the destruction of their commerce and their fisheries, and the federal government did little or nothing for their protection from the enemy. To remedy these evils the celebrated Hartford convention was held. (See HARTFORD CONVENTION.) For many years the democrats continued to impute treasonable designs to that convention, and it was one of the causes which led to the decay and extinction of the federal party. In the latter part of 1813 and the beginning of 1814 the country of the Creek Indians, within the present limits of Alabama, was invaded by four columns, one under Gen. Jackson, and that tribe was severely defeated and compelled to cede the greater part of its lands. During the war the Algerines had resumed their old practice of piracy, had seized several American vessels, and had insulted and plundered the American consul. Immediately after the conclusion of peace with Great Britain a naval force commanded by Decatur was sent to the Mediterranean, which captured several Algerine cruisers, and in a few weeks compelled the rulers of Algiers, Tunis, and Tripoli to make indemnity for their outrages, and to agree to abstain from depredations on American commerce

The national finances were in a very confused state at the close of the war, the debt created by which exceeded $80,000,000. The banks, except in New England, had suspended specie payments, and the want of a uniform and solvent currency was urgently felt. To remedy this latter evil, congress in 1816 chartered for 20 years a national bank at Philadelphia, with a capital of $35,000,000, whose notes furnished a convenient and uniform circulating medium, convertible at all times into gold and silver.—The presidential election of 1812 had resulted in the choice of Mr. Madison for a second term by a vote of 128, against 89 for De Witt Clinton, who was supported by the federalists. Elbridge Gerry was chosen vice president by 131 votes to 86 for Jared Ingersoll. On the approach of the presidential election of 1816, James Monroe of Virginia, Mr. Madison's secretary of state, received the democratic nomination, and in the election was chosen by 183 votes, against 34 votes given to Rufus King by the federal states of Massachusetts, Connecticut, and Delaware. Daniel D. Tompkins of New York was elected vice president. The administration of Mr. Madison terminated March 4, 1817. The war with Great Britain was its principal feature, but among other events of importance were the admission of Louisiana into the Union in 1812, and of Indiana in 1816. President Monroe's cabinet was constituted as follows: J. Q. Adams, secretary of state; William H. Crawford, of the treasury; John C. Calhoun, of war; Benjamin W. Crowninshield, of the navy; and William Wirt, attorney general. His administration commenced under very favorable circumstances. Party distinctions had so nearly disappeared, that democrats and federalists combined to support the government. Monroe was reëlected in 1820 by all the electoral votes except one. Daniel D. Tompkins was reëlected vice president by nearly the same vote. In the spring of 1818 Gen. Jackson led a force against the Seminole Indians in Florida, and destroyed several of their villages. The main event of Monroe's administration was the Missouri controversy, by which for the first time the country was divided upon the slavery question. The admissions to the Union hitherto had been of slaveholding and non-slaveholding states in compensating order. Vermont and Kentucky, Tennessee and Ohio, Louisiana and Indiana had offset each other; and in 1817 the slaveholding state of Mississippi was admitted, followed immediately in 1818 by non-slaveholding Illinois. Congress in its session of 1818-'19 authorized the territory of Alabama, which was rapidly filling with a slaveholding population, to form a constitution without any prohibition of slavery. A similar bill was brought forward for the territory of Missouri, and James Tallmadge of New York moved in the house of representatives to insert a clause prohibiting any further introduction of slaves, and granting freedom to the children of those already there on their attaining the age of 25; and this motion was carried by a vote of 87 to 76. A few days later John W. Taylor of New York moved as an amendment to a bill for the organization of the territory of Arkansas, that slavery should not thereafter be introduced into any part of the territories ceded by France to the United States N. of lat. 36° 30′. This was intended as a compromise, but was warmly opposed, a large number both of northern and southern members declaring themselves hostile to any compromise whatever, and the amendment was consequently withdrawn. The slaveholders contended that for congress to prohibit slavery in the territories would be a violation of the constitutional right of the citizen to enjoy his property anywhere within the jurisdiction of the United States. The restrictionists, on the other hand, denied that men could be property under the jurisdiction of the United States, however the case might be under the laws of particular states; and they maintained that the constitutional question was conclusively settled by the action of the congress contemporaneous with the framing of the federal constitution, which in 1787 introduced into the bill for the government of the territory N. W. of the Ohio the proviso that "there shall be neither slavery nor involuntary servitude in said territory, otherwise than in punishment for crime." And in further confirmation of their views, they brought forward the fact that the most distinguished statesman of the south, Thomas Jefferson, had in 1784 introduced and urged with all his influence the passing of a bill in congress prohibiting slavery not only in all the territory held by the United States, but in all that might be afterward acquired. The debate on this subject was long and excited. The southern orators declared that if the restriction should be persisted in the south would retire and the Union be dissolved. The senate refused to concur in the restriction imposed by the house, and consequently the Missouri bill failed for the session of 1818-'19. During the recess of congress a strong public agitation against slavery arose in the middle states, and finally spread to New England, both democrats and federalists coöperating in it. Alabama was admitted into the Union early in the session of 1819-'20, an event promptly followed by the admission of Maine. When the legislatures of the free states met in their annual session in 1820, the agitation among the people on the slavery question was forcibly expressed by their representatives. Pennsylvania led off by a solemn appeal to the states "to refuse to covenant with crime," and by a unanimous declaration that it was the right and the duty of congress to prohibit slavery in the territories. The rest of the middle states also unanimously adopted similar resolutions. Ohio and Indiana took the same position; and though the New England legislatures were silent, numerous memorials from towns, cities, and public meetings there in favor of freedom were laid before congress. The legislatures of the slave states expressed themselves, on the other hand, very strongly in opposition to restriction. In congress the debate was long and acrimonious. The senate sent to the house the Missouri bill with the prohibition of slavery in that state struck out, but with the proviso that it should not thereafter be tolerated N. of lat. 36° 30′. The striking out of the restrictive clause was reluctantly assented to by the house by a vote of 90 to 87, a very few northern members voting for it. The compromise by which slavery was prohibited for ever N. of 36° 30′ was then agreed to by a vote of 134 to 42. The northern states acquiesced in this compromise as a political necessity, and as finally settling a controversy dangerous to the peace and stability of the Union, and the slavery agitation subsided for a time. Missouri was finally admitted as a state in 1821. The other great question of Mr. Monroe's administration was the recognition of the Spanish American republics, which had declared and maintained their independence for several years. Chiefly by the efforts and the eloquence of Henry Clay, their independence was acknowledged in 1822; and in the following year the president in his annual message put forth a declaration which has since been famous as the "Monroe doctrine." In this it was announced that any attempt on the part of European governments to extend their system to any portion of this hemisphere would be considered dangerous to the peace and safety of the United States; that the republic would not interfere with existing colonies or dependencies, but would regard as the manifestation of an unfriendly disposition to the United States any attempt of a European power to oppress or control the destiny of the governments whose independence the United States had acknowledged. In 1819 Florida had been ceded by Spain.—In the presidential election of 1824 the confused state of parties led to the nomination of four candidates, none of whom had a majority of the electoral votes. Andrew Jackson received 99, John Quincy Adams 84, William H. Crawford 41, and Henry Clay 37. The election went to the house of representatives (the choice being between the three highest candidates), where Mr. Adams received the vote of 13 states, and was declared president; while Jackson received the vote of 7 and Crawford of 4 states. John C. Calhoun had been elected vice president by the electoral colleges, receiving 182 votes to 78 for all others. The total popular vote (the electors in six states being chosen by the legislature) was 352,062, viz.: 155,872 for Jackson, 105,321 for Adams, 46,587 for Clay, and 44,282 for Crawford. The political views of Mr. Adams did not differ from those of Mr. Monroe, and his foreign and domestic policy was very similar. He appointed Henry Clay secretary of state, Richard Rush of the treasury, James Barbour of war, Samuel L. Southard of the navy, and William Wirt attorney general. His administration was remarkable for order, method, and economy, though party spirit was higher than it had been for many years. Perhaps the most important event in his term was the adoption of what was called the American system of protecting home manufactures by a heavy duty upon foreign articles of the same kind, a system popular in the manufacturing north, but bitterly opposed in portions of the agricultural south. A tariff law enacted in 1828 on the principle of protection led a few years later to serious political complications. The presidential contest of the same year was carried on with great animation and virulence, chiefly by means of discussions on the personal character and history of the candidates, Gen. Jackson having been nominated in opposition to Mr. Adams. The result was the election of Jackson by 178 votes to 83 for Adams, while John C. Calhoun was reëlected vice president in opposition to Richard Rush. The popular vote was 647,231 for Jackson and 509,097 for Adams. President Jackson selected for his cabinet Martin Van Buren, secretary of state; Samuel D. Ingham, of the treasury; John H. Eaton, of war; John Branch, of the navy; John McPherson Berrien, attorney general; and William T. Barry, postmaster general. The last named officer was now for the first time made a member of the cabinet. In his first annual message, December, 1829, the president took strong ground against the renewal of the charter of the United States bank, as an institution not authorized by the constitution. A long and excited contest ensued in congress and among the people on this question. Congress in 1832 passed a bill to recharter the bank, but Jackson vetoed it; and as it failed to receive the votes of two thirds of the members of both houses, the bank charter expired by limitation in 1836. The commercial part of the community in this contest generally took the side of the bank, and the party formed in opposition to the president assumed the name of whig, while his supporters adhered to the old name of democrats. The tariff of 1828 had always been distasteful to the cotton-growing states, and on the passing of an act of congress in the spring of 1832 imposing additional duties upon foreign goods, the discontent of South Carolina broke out in almost actual rebellion. A state convention held there in November declared the tariff acts unconstitutional and therefore null and void, and proclaimed that any attempt by the general government to collect duties in the port of Charleston would be resisted by force of arms, and would produce the secession of South Carolina from the Union. The chief leaders of the nullifiers, as this South Carolina party was called, from their assertion of the right of a state to nullify an act of congress which she deemed unconstitutional, were John C. Calhoun, who had resigned the vice presidency and become a senator of the United States;

Robert Y. Hayne, also a senator; and George McDuffie, governor of the state. The nullifiers made considerable military preparations, and for a time civil war between South Carolina and the federal government seemed inevitable. Jackson had just been reëlected for a second term by 219 electoral votes, against a divided opposition which cast 49 votes for Henry Clay, 11 for John Floyd, and 7 for William Wirt, while Mr. Van Buren was chosen vice president. The popular vote was 687,502 for Jackson and 530,189 for his opponents. All the disposable army was ordered to assemble at Charleston under Gen. Scott, and a ship of war was sent to that port to insure the collection of duties. A proclamation was issued, Dec. 10, 1832, denying the right of a state to nullify any act of the federal government, and warning all engaged in fomenting the rebellion that the laws against treason would be enforced at all hazards and to their utmost penalties. The leaders of the nullifiers were also privately given to understand that if they committed any overt act they should surely be hanged. The firmness of the president, who in this conjuncture was warmly supported by the great mass of the nation of all parties, gave an effectual check to the incipient rebellion, and the affair was finally settled by a proposition brought forward in congress by Henry Clay, the leading champion of the protective system, for the modification of the tariff by a gradual reduction of the obnoxious duties; a compromise which was accepted by the nullifiers as the only means of escape from the perilous position in which they had placed themselves. Meanwhile the president's vehemence in party matters had led to sweeping removals from office, and a personal quarrel to changes in the cabinet, which in the latter part of 1831 was constituted thus: Edward Livingston, secretary of state; Louis McLane, of the treasury; Lewis Cass, of war; Levi Woodbury, of the navy; and Roger B. Taney, attorney general. Barry remained postmaster general. In his annual message in December, 1832, the president recommended the removal of the public funds from the bank of the United States, where they were by law deposited. Congress by a decisive vote refused to authorize the removal, and the president on his own responsibility directed the secretary of the treasury to withdraw the deposits and place them in certain state banks. That officer refusing, he was removed, and Mr. Taney, the attorney general, appointed in his place, who complied with the order. This step was attended by a financial panic, and great commercial distress immediately ensued. A resolution censuring the president was passed in the senate, but the house of representatives sustained him. The foreign policy of President Jackson was very successful. Useful commercial treaties were made with several countries, and indemnities for spoliations on American commerce were obtained from France, Spain, Naples, and Portugal. At home the principal events of his administration, besides those already mentioned, were the extinction of the national debt, the beginning, toward the close of 1835, of the war with the Seminole Indians in Florida, and the admission of Arkansas (1836) and Michigan (1837) into the Union.—In the presidential contest of 1836 Mr. Van Buren, who was supported by the democrats, received 170 electoral votes, and was elected; while the opposition or whig vote was divided between William Henry Harrison (73), Hugh L. White (26), Daniel Webster (14), and Willie P. Mangum (11). No candidate having been elected vice president, Richard M. Johnson, who had received the highest number of votes (147, against 77 for Francis Granger, 47 for John Tyler, and 23 for William Smith), was chosen by the senate. The popular vote was 761,549 for Van Buren and 736,656 for the opposition candidates. President Van Buren selected as his cabinet, John Forsyth, secretary of state; Levi Woodbury, of the treasury; Joel R. Poinsett, of war; Mahlon Dickerson, of the navy; B. F. Butler, attorney general; and Amos Kendall, postmaster general. All of these except Mr. Poinsett had been members of President Jackson's cabinet at the close of his last term; but several changes were subsequently made, James K. Paulding becoming secretary of the navy and Felix Grundy attorney general in 1838, Henry D. Gilpin attorney general and John M. Niles postmaster general in 1840. The new administration commenced under most untoward circumstances. The business of the country, affected by excessive speculation and overtrading, and by sudden contractions and expansions of the currency, was on the verge of ruin. Within two months after the inauguration of the president the mercantile failures in the city of New York alone amounted to more than $100,000,000. Nearly the whole of Mr. Van Buren's term was occupied with attempts to remedy these evils by legislative measures for the establishment of a stable currency and a sound system of government finance. A favorite measure of the president was the independent treasury system for the custody of the public funds, which was ultimately sanctioned by congress, and is still in force. The war with the Seminoles was not ended till 1842. The pecuniary troubles were imputed in great measure to the financial policy of the administration by its political opponents; and, as the presidential election of 1840 approached, the state elections indicated that the democratic party was in danger of overthrow. A whig national convention (the congressional caucus system for nominating candidates having been abandoned) was held at Harrisburg, Dec. 4, 1839, and Gen. Harrison was nominated for president, with John Tyler for vice president. The national democratic convention met at Baltimore, May 5, 1840, and unanimously nominated Mr. Van Buren. The canvass was one of the most animated and exciting that have ever taken place, and the result was that Harrison and Tyler each received 234 electoral votes, and Van Buren 60 (those of New Hampshire, Virginia, South Carolina, Illinois, Alabama, Missouri, and Arkansas), while the same number were divided between R. M. Johnson, L. W. Tazewell, and James K. Polk as democratic candidates for the vice presidency. The popular vote was 1,275,011 for Harrison and 1,128,702 for Van Buren. Gen. Harrison was inaugurated March 4, 1841, and selected as his cabinet Daniel Webster, secretary of state; Thomas Ewing, of the treasury; John Bell, of war; George E. Badger, of the navy; Francis Granger, postmaster general; and J. J. Crittenden, attorney general. Before any distinctive line of policy could be adopted by the new administration, the president died, April 4. The presidential office devolved on John Tyler, who retained the cabinet of his predecessor until the following September, when all but the secretary of state resigned in consequence of the unexpected development of a policy on the part of the president in relation to a national bank much more in accordance with the views of the democratic party, to which he had formerly been attached, than to those of the whigs, by whom he had been elevated to power. A treaty was concluded in 1842 with Great Britain by Mr. Webster for the settlement of the northeastern boundary. On April 12, 1844, a treaty to annex Texas to the United States was concluded by Mr. Calhoun and the agents of the new republic, but was rejected by the senate, on the ground that it would involve the country in a war with Mexico. The Texas question immediately became the prominent issue in the presidential contest of that year, the democratic party supporting and the whigs opposing annexation. At the south it was advocated as a means of strengthening the slavery interest, and at the north it was in great part opposed for the same reason, the anti-slavery element in both the parties being at this period of considerable strength. The friends of Texas soon obtained control of the democratic party, and, Mr. Van Buren having expressed unconditional opposition to annexation, at the national convention of that party at Baltimore, May 27, 1844, James K. Polk was nominated for president, and George M. Dallas for vice president. The whig national convention, which met at Baltimore May 1, had already nominated for president Henry Clay, and for vice president Theodore Frelinghuysen. The result of the election was 170 electoral votes for Polk and Dallas, and 105 for the whig candidates. The popular vote was 1,337,243 for Polk and 1,299,062 for Clay. The management of the Texas question was now assumed by congress, and joint resolutions for annexing that country to the United States as one of the states of the Union were signed by President Tyler March 1, 1845; and his last important official act was to sign two days later the bill for the admission of Florida and Iowa into the Union.—President Polk appointed as his cabinet James Buchanan, secretary of state; Robert J. Walker, of the treasury; William L. Marcy, of war; George Bancroft, of the navy; Cave Johnson, postmaster general; and John Y. Mason, attorney general. At the beginning of his administration the country was involved in disputes with Mexico, growing out of the annexation of Texas to the United States. Gen. Zachary Taylor was sent with a small army to occupy the region between the Nueces and the Rio Grande, which the United States claimed as belonging to Texas, while the Mexicans maintained that Texas had never extended beyond the Nueces. In April, 1846, a slight collision occurred on the Rio Grande between Gen. Taylor's army and that of the Mexican commander, Gen. Arista. On May 11 the president sent a special message to congress declaring that "war existed by the act of Mexico," and asking for men and money to carry it on. Congress, by a vote of 142 to 14 in the house, and of 40 to 2 in the senate, appropriated $10,000,000, and gave authority to call out 50,000 volunteers. Taylor meanwhile had defeated the Mexicans at Palo Alto, May 8, and at Resaca de la Palma, May 9, and on being reënforced continued the war by brilliant victories at Monterey in September, and at Buena Vista, Feb. 23, 1847. (See TAYLOR, ZACHARY.) The conduct of the war was now assumed by Gen. Scott, commanding in chief. On March 9, 1847, he landed near Vera Cruz with about 12,000 men; that city was immediately besieged, and surrendered before the end of the month. Gen. Scott entered the city of Mexico on Sept. 14, after a series of hard-fought and uniformly successful battles. (See SCOTT, WINFIELD.) Meanwhile Gen. Stephen W. Kearny, at the head of a small force, had marched from Fort Leavenworth over the great plains to Santa Fé, and conquered New Mexico in August, 1846. He instituted an American government over the province, and then resumed his march toward California, which had already been conquered by Col. Fremont and Commodore Stockton. On his arrival at Monterey, Gen. Kearny assumed the office of governor, and on Feb. 8, 1847, proclaimed the annexation of California to the United States. While Kearny was on his way to California, Col. Doniphan, at the head of 1,000 Missouri volunteers, had made a prodigious march across the plains, and taken the city of Chihuahua, after routing, Feb. 28, 4,000 Mexicans, who met him about 18 m. from the city. Gen. Scott's army occupied the Mexican capital until after the ratification of a treaty of peace which was negotiated at Guadalupe Hidalgo, Feb. 2, 1848, by Nicholas P. Trist on the part of the United States. By this treaty Mexico granted to the United States the line of the Rio Grande as a boundary, and also ceded New Mexico and California. On their part the United States agreed to pay Mexico $15,000,000, and to assume the debts due by Mexico to American citizens to an extent not exceeding $3,500,000. At the beginning of the Mexican war negotiations in relation to the Oregon region were going on between Great Britain and the United States. "The whole of Oregon up to 54° 40′" had been one of the watchwords of the democratic party during the recent presidential canvass, and Mr. Polk in his inaugural address had declared that "our title to the country of the Oregon was clear and unquestionable." But Great Britain, on various pretexts, asserted a claim to the whole country, and the president after much negotiation finally offered as an amicable compromise the boundary of the parallel of 49°, with a modification giving to her the whole of Vancouver island, which was agreed to by Great Britain. The other important measures of Mr. Polk's administration were the revision of the tariff in 1846, by which its protective features were lessened, and the admission (1848) of Wisconsin into the Union as the 30th state, Florida and Texas having been admitted in 1845, and Iowa in 1846.—In the democratic national convention which met at Baltimore May 22, 1848, Lewis Cass was nominated for president, and William O. Butler for vice president. By the whig convention, which met at Philadelphia on June 7, Zachary Taylor and Millard Fillmore were nominated. The question of slavery had a powerful influence on the political combinations of this period. After the subsidence of the Missouri agitation in 1821, slavery attracted little attention until the establishment of the "Liberator" newspaper by William Lloyd Garrison at Boston, Jan. 1, 1831, and the formation of anti-slavery societies in the free states in 1832–'3 by Arthur Tappan and others. These societies relied exclusively on moral and religious influences to promote emancipation, and avoided political action, affirming that congress had no right to interfere with slavery in the states, though they petitioned that body to abolish slavery in the territories, in the District of Columbia, and wherever else the federal government had constitutional jurisdiction. Violent attempts were made to suppress the agitation throughout the country, resulting in many places in serious riots. Several of the southern legislatures called upon those of the north to suppress the movement by penal enactments. President Jackson in his message to congress in 1835 recommended the adoption of a law prohibiting the circulation of anti-slavery publications through the mails; and a bill for that purpose reached a third reading in the senate, but was finally rejected. In the house of representatives a rule was adopted in 1836 that all anti-slavery petitions should be laid on the table without reference or consideration; this rule was finally rescinded in 1845. In 1840 a disagreement among the abolitionists led to their separation into two divisions, one of which, consisting only of a few hundred men, under the lead of Mr. Garrison, in 1844 took the position that the compromises of the constitution on the subject of slavery were immoral, and that consequently it was sinful to swear to support that instrument or to hold office or vote under it, and that the union of the states was "an agreement with hell and a covenant with death," which ought to be at once dissolved. The other and far more numerous division of the abolitionists, with whom the followers of Mr. Garrison were often erroneously confounded, adhered to the Union and the constitution, and, having become satisfied that both the whig and democratic parties were completely under the control of the slaveholders, established in 1840 the "liberty party," and at a national convention held at Albany nominated James G. Birney for president and Thomas Earle for vice president. Their entire vote at the election of 1840 was 7,059. In 1844 Mr. Birney was again nominated for president, with Thomas Morris for vice president, and received 62,300 votes. These figures, however, imperfectly represented the numbers of the opponents of slavery, most of whom still maintained their connection with the two great parties, on whose action they had a powerful influence. In 1846, during the Mexican war, a bill being before congress authorizing the president to use $2,000,000 in negotiating a peace, David Wilmot, a democratic representative from Pennsylvania, moved to add thereto the proviso that, "as an express and fundamental condition to the acquisition of any territory from the republic of Mexico by the United States, by virtue of any treaty to be negotiated between them, and to the use by the executive of the moneys herein appropriated, neither slavery nor involuntary servitude shall ever exist in any part of said territory, except for crime, whereof the party shall be first duly convicted." This proviso was adopted in the house, nearly all the members from the free states voting for it, but failed in the senate from want of time. At the next session, 1846–'7, a similar bill appropriating $3,000,000 was finally passed without the proviso. On the termination of the war, the practical question involved in the Wilmot proviso, whether the introduction of slavery should be allowed or prohibited in the territories newly acquired from Mexico, became of prominent interest. In the whig national convention by which Gen. Taylor was nominated were several delegates from the northern states representing what were called "free-soil" opinions, that is, opinions hostile to the extension of slavery; several of these withdrew on the rejection of a resolution committing the party against the introduction or existence of slavery in the territories, and subsequently separated themselves from the whig party. A similar schism had already taken place in the democratic national convention of the same year, the "barnburners," as the free-soil democrats were termed, having seceded partly on anti-slavery and partly on personal grounds. An agreement was soon made between these seceding whigs and democrats and the liberty party to unite their forces in opposition to the extension of slavery; and a convention was held at Buffalo, Aug. 9, 1848, which was attended by delegates from all the free states and from Delaware, Maryland, Virginia, and the District of Columbia. A free-soil or free democratic party was formed, and Martin Van Buren was nominated for president and Charles Francis Adams for vice president. A platform was adopted, declaring that the new party was formed "to maintain the rights of free labor against the aggressions of the slave power, and to secure free soil to a free people; that slavery, in the several states of this Union which recognize its existence, depends upon the state laws alone, which cannot be repealed or modified by the general government, and for which laws that government is not responsible; we therefore propose no interference by congress with slavery within the limits of any state; that the only safe means of preventing an extension of slavery into territory now free is to prohibit its extension in all such territory by an act of congress; that we accept the issue which the slave power has forced upon us, and to their demand for more slave states and more slave territory, our calm but final answer is, no more slave states and no more slave territory." Van Buren and Adams received at the presidential election, in November, 1848, a popular vote of 291,263, but secured no electoral vote. The democratic candidates, Cass and Butler, received 127 electoral votes; and the whig candidates, Taylor and Fillmore, received 163 electoral votes, and were elected. The popular vote for Taylor was 1,360,099 and for Cass 1,220,544.—President Taylor was inaugurated on Monday, March 5, 1849, and appointed as his cabinet John M. Clayton, secretary of state; William M. Meredith, of the treasury; George W. Crawford, of war; William B. Preston, of the navy; Thomas Ewing, of the interior (an office created by congress two days before, March 3, 1849); Jacob Collamer, postmaster general; and Reverdy Johnson, attorney general. One of the earliest and most difficult of the questions which pressed on the new administration arose out of the acquisition of California, the people of which in 1849 framed a constitution prohibiting slavery. This being presented to congress early in 1850 with a petition for the admission of that region as a state, great excitement in congress and throughout the country arose. The extreme slavery party, led by Mr. Calhoun, demanded not only the rejection of California, but, among other concessions, an amendment of the constitution that should equalize the political power of the free and slave states. The question was still further complicated by the application of New Mexico for admission, and by a claim brought forward by Texas to a western line of boundary which would include a large portion of New Mexico. Finally a compromise was proposed by Henry Clay in the senate as a final settlement of the whole question of slavery, and after a long discussion the result aimed at by Mr. Clay was attained by separate acts, which provided for: 1, the admission of California as a free state; 2, territorial governments for New Mexico and Utah without excluding slavery, but leaving its exclusion or admission to the local population; 3, the settlement of the Texas boundary question; 4, the abolition of the slave trade in the District of Columbia; 5, the enactment of a stringent law for the arrest and return of fugitive slaves. Ten of the southern senators, including Mason and Hunter of Virginia, Soulé of Louisiana, and Jefferson Davis of Mississippi, published a final protest against the admission of California after the vote was taken; and the free-soil party at the north denounced the concessions to Texas and the refusal to prohibit slavery in New Mexico and Utah as unjust and unwise, and proclaimed the fugitive slave law unconstitutional, immoral, and cruel. While the compromise bills were yet before congress, President Taylor died, July 9, 1850, and was succeeded by the vice president, Millard Fillmore, who soon after reconstructed the cabinet as follows: Daniel Webster, secretary of state; Thomas Corwin, of the treasury; Charles M. Conrad, of war; Alexander H. H. Stuart, of the interior; William A. Graham, of the navy; Nathan K. Hall, postmaster general; and John J. Crittenden, attorney general. The acts relating to California, New Mexico, Utah, and Texas were signed by Mr. Fillmore on Sept. 9, the fugitive slave act on the 18th, and the District of Columbia act on the 20th; and the whole weight of his administration was given to the support of these measures. During the remainder of his term the events of most importance were the invasion of Cuba, in August, 1851, by a band of "filibusters" from New Orleans, led by Gen. Lopez, who was speedily captured and executed with many of his followers; the visit of Louis Kossuth to the United States in December, 1851; a dispute with England on the subject of the fisheries in 1852, which was settled by mutual concessions; and lastly the negotiation of a treaty with Japan by Commodore Perry, in command of an American fleet, by which the commerce of that empire was thrown open to the world.—On the approach of the presidential election of 1852 it became evident that, notwithstanding the apparent acquiescence of the great mass of the people in the compromise measures of 1850, the question of slavery was still a source of political agitation. The democrats of the south were divided into "Union men" and "southern rights men," the latter maintaining the right of a state to secede from the Union whenever its rights were violated by the general government. On the other hand, the whigs of the south were mostly Union men and satisfied with the compromise measures, while a majority of the whigs of the north were opposed to the fugitive slave law, though not offering resistance to its execution, and were still desirous of preventing the extension of slavery by national legislation. The democratic national convention met at Baltimore, June 1, 1852, and nominated for president Franklin Pierce of New Hampshire, who was known to hold opinions satisfactory to the south on the subject of slavery. William R. King of Alabama was nominated for vice president. The platform declared resistance to "all attempts at renewing in congress or out of it the agitation of the slavery question, under whatever shape or color the attempt may be made;" and also a determination to "abide by and adhere to a faithful execution of the acts known as the compromise measures settled by the last congress, the act for reclaiming fugitives from service or labor included." The whig national convention met at Baltimore, June 16, and nominated for president Gen. Winfield Scott and for vice president William A. Graham of North Carolina. The platform declared that "the series of acts of the 31st congress, commonly known as the compromise or adjustment, the act for the recovery of fugitives from labor included, are received and acquiesced in by the whigs of the United States as a final settlement in principle and substance of the subjects to which they relate; . . . . and we deprecate all further agitation of the questions thus settled, as dangerous to our peace, and will discountenance all efforts to continue or renew such agitation, whenever, wherever, or however made." The national convention of the free-soil party was held at Pittsburgh, Aug. 11, all the free states being represented, together with Delaware, Maryland, Virginia, and Kentucky. John P. Hale was nominated for president, and George W. Julian for vice president. A platform was adopted declaring "that the acts of congress known as the compromise measures of 1850, by making the admission of a sovereign state contingent upon the adoption of other measures demanded by the special interest of slavery, by their omission to guarantee freedom in the free territories, by their attempt to impose unconstitutional limitations on the power of congress and the people to admit new states, and by their invasion of the sovereignty of the states and the liberties of the people through the enactment of an unjust, oppressive, and unconstitutional fugitive slave law, are proved to be inconsistent with all the principles and maxims of democracy, and wholly inadequate to the settlement of the questions of which they are claimed to be an adjustment. That no permanent settlement of the slavery question can be looked for except in the practical recognition of the truth that slavery is sectional and freedom national; by the total separation of the general government from slavery, and the exercise of its legitimate and constitutional influence on the side of freedom; and by leaving to the states the whole subject of slavery and the extradition of fugitives from justice." At the election, Nov. 2, 1852, the democratic candidates, Pierce and King, received 254 electoral votes from 27 states. Scott and Graham received the 42 votes of Vermont, Massachusetts, Kentucky, and Tennessee. The popular vote for Pierce and King was 1,601,474, for Scott and Graham 1,386,578, and for Hale and Julian 155,825. President Pierce was inaugurated March 4, 1853, and appointed as his cabinet William L. Marcy, secretary of state; James Guthrie, of the treasury; Jefferson Davis, of war; James C. Dobbin, of the navy; Robert McClelland, of the interior; James Campbell, postmaster general; and Caleb Cushing, attorney general. One of the first questions that occupied the administration was a boundary dispute with Mexico concerning a tract of land bordering on New Mexico and comprising 45,535 sq. m., which finally by negotiation and purchase became a part of the United States. It is known as the Gadsden purchase, from the American minister who negotiated the treaty, and forms part of Arizona and New Mexico. In 1853 various expeditions were sent out to explore the routes proposed for a railroad from the Mississippi to the Pacific. In January, 1854, Stephen A. Douglas, chairman of the senate committee on territories, reported a bill for the organization of two new territories, Kansas and Nebraska, in the region west of Missouri and north of lat. 36° 30′. By this bill the Missouri compromise act of 1820 was repealed, and slavery allowed to enter where it had been formally and for ever excluded. The measure was warmly supported by the administration and by the leaders of the democratic party, and was strenuously opposed in debates of extraordinary length and interest by Chase and Wade of Ohio, Everett and Sumner of Massachusetts, Seward of New York, Fessenden of Maine, Houston of Texas, and Bell of Tennessee, in the senate, where it finally passed by a vote of 37 to 14. In the house it was opposed by Thomas H. Benton of Missouri and others; but it passed by a vote of 113 to 100, and the bill became a law on the last day of May. This bill roused great excitement and indignation in the free states, where it was denounced as a flagrant breach of faith, and its enactment greatly increased the strength of the anti-slavery party. Much dissatisfaction also was caused in those states by a conference at Ostend between the United States ministers to England, France, and Spain (Buchanan, Mason, and Soulé), in the circular issued by whom it was proposed to buy Cuba from Spain, or, if necessary to prevent emancipation in the island, to take it by force. The attempt to obtain Cuba was regarded at the north as prompted, like the repeal of the Missouri compromise, chiefly by a desire to extend and strengthen the slaveholding influence in the United States. So also were the filibuster expeditions against

Nicaragua led by William Walker, whose envoy at Washington, Vijil, was formally recognized by the president in 1856. (See Walker, William.) As, by the terms of the Kansas and Nebraska act, the people of those territories were to be left free to determine for themselves whether or not slavery should be tolerated there, a struggle soon began in Kansas, to which chiefly emigration was directed, between the anti-slavery and pro-slavery parties, which, after many acts of violence and a long period of confusion amounting almost to civil war, terminated in the adoption by the people of Kansas of a state constitution excluding slavery. (See Kansas.) In the course of the debates on the Kansas question Mr. Sumner of Massachusetts made a speech in the senate, May 19 and 20, 1856, and two days afterward was assailed in the senate chamber by Preston S. Brooks of South Carolina for expressions therein, and so much injured that he was long unable to resume his duties. This event increased still further the anti-slavery feeling at the north; and when the canvass for president began in 1856, an anti-slavery party appeared in the field of far more formidable dimensions than any previous organization of the kind. This party assumed the name of republican, and absorbed the entire free-soil party, the greater part of the whig party, and considerable accessions from the democratic party. The first decisive exhibition of its strength was the election in the congress of 1855–'6 of N. P. Banks, a former democrat, as speaker of the house of representatives. The whig party about this period disappeared from the field, that portion of it opposed to anti-slavery measures having been merged, especially at the south, in an organization called the American party from its opposition to foreign influence, and particularly to Roman Catholic influence, in our political affairs, but popularly known as the "Know-Nothing party" from the secrecy of its organization and the reticence of its members. This party held a national convention at Philadelphia, Feb. 22, 1856, and, after adopting a platform virtually recognizing the principles of the Kansas-Nebraska act and approving the fugitive slave law, nominated Millard Fillmore for president, and Andrew J. Donelson of Tennessee for vice president. The democratic national convention met at Cincinnati, June 2, and reaffirmed the Baltimore platform of 1852, with the addition of resolutions condemning the principles of the American party, recognizing the Kansas-Nebraska act as the only safe solution of the slavery question, affirming the duty of upholding state rights and the Union, and assenting generally to the doctrines of the Ostend circular. James Buchanan of Pennsylvania was nominated for president, and John C. Breckinridge of Kentucky for vice president. The republican national convention met at Philadelphia, June 17, and adopted a platform declaring that "the maintenance of the principles promulgated in the Declaration of Independence and embodied in the federal constitution is essential to the preservation of our republican institutions, and that the federal constitution, the rights of the states, and the union of the states shall be preserved;" and that "the constitution confers upon congress sovereign power over the territories of the United States for their government, and in the exercise of this power it is the right and the duty of congress to prohibit in the territories those twin relics of barbarism, polygamy and slavery." John C. Fremont of California was nominated for president, and William L. Dayton of New Jersey for vice president. The election resulted in the choice of Buchanan and Breckinridge by 174 electoral votes, against 114 for Fremont and 8 for Fillmore. The popular vote for Buchanan was 1,838,169, for Fremont 1,341,264, and for Fillmore 874,534. Fillmore received the vote of Maryland, Buchanan the votes of all the other slave states and of New Jersey, Pennsylvania, Indiana, Illinois, and California (19 in all), and Fremont those of the 11 remaining free states.—President Buchanan appointed as his cabinet Lewis Cass, secretary of state; Howell Cobb, of the treasury; John B. Floyd, of war; Isaac Toucey, of the navy; Jacob Thompson, of the interior; Aaron V. Brown, postmaster general; and Jeremiah S. Black, attorney general. With the exception of a rebellion of the Mormons in Utah in 1857–'8, which was suppressed without bloodshed, and of the admission into the Union of Minnesota in 1858 and of Oregon in 1859, the chief interest of Mr. Buchanan's administration centred around the slavery controversy, which still continued in Kansas, in the halls of congress, and in the legislatures of the free states. Several of the latter bodies, under the influence of a growing public opinion in opposition to the justice and constitutionality of the fugitive slave law, passed acts designed to impede its operation, and to secure to alleged fugitives the right to trial by jury and to the legal assistance usually given to those charged with criminal offences. These acts were commonly called personal liberty laws. An important element in the slavery controversy was the decision of the supreme court in the case of Dred Scott, rendered soon after the inauguration of Presidant Buchanan. (See Taney, Roger Brooke.) A constitution for Kansas framed at Lecompton in 1857 was laid before congress in the session of 1857–'8, and was strongly opposed by the republicans on the ground that it had been fraudulently concocted by the pro-slavery party there, that it did not represent the wishes of the people of Kansas, and that some of its provisions were cunningly framed for the purpose of forcing slavery into the new state in spite of the opposition of the inhabitants. A powerful section of the democratic party, headed by Stephen A. Douglas, sided with the republicans in this matter; but the so-called "Lecompton bill," submitting this constitution to the people under certain conditions, after a parliamentary struggle of extraordinary intensity and duration, was passed by congress by the votes of the democratic majority, led in the house by Alexander H. Stephens of Georgia, and in the senate by Jefferson Davis of Mississippi, John M. Mason of Virginia, and John Slidell of Louisiana. The president lent all his influence to the measure, on the ground that it would pacify the country, and would not prevent Kansas from becoming a free state if the people desired to exclude slavery. This contest resulted in a schism in the democratic party, and eventually in its division into two bodies, one of which looked upon Mr. Douglas as its leader, while the other supported for the presidency John C. Breckinridge of Kentucky. An attempt to free slaves by force of arms, made at Harper's Ferry in October, 1859, by John Brown of Kansas, for which he was hanged by the authorities of Virginia, Dec. 2, created a profound sensation throughout the country. (See BROWN, JOHN, vol. iii., p. 338.) In January, 1861, after the withdrawal of southern members of congress, Kansas was admitted into the Union under a constitution framed at Wyandotte in 1859.—The democratic national convention met at Charleston, April 23, 1860, and a controversy on the subject of slavery immediately arose. On the 30th a platform was adopted by a vote of 165 to 138, the essential portion of which was as follows: "Inasmuch as differences of opinion exist in the democratic party as to the nature and extent of the powers of a territorial legislature, and as to the powers and duties of congress, under the constitution of the United States, over the institution of slavery within the territories; resolved, that the democratic party will abide by the decisions of the supreme court of the United States on the questions of constitutional law." Most of the southern delegates thereupon withdrew, and on May 3 the convention adjourned to meet at Baltimore on June 18, after recommending that the vacant seats be filled prior to that date. The seceding delegates met, adopted a platform, and adjourned after calling a convention to assemble at Richmond on June 11. The portion of their platform relating to slavery was as follows: "That the government of a territory organized by an act of congress is provisional and temporary; and, during its existence, all citizens of the United States have an equal right to settle with their property in the territory, without their rights, either of person or property, being destroyed or impaired by congressional or territorial legislation. That it is the duty of the federal government, in all its departments, to protect, when necessary, the rights of persons and property in the territories, and wherever else its constitutional authority extends. That when the settlers in a territory having an adequate population form a state constitution, the right of sovereignty commences, and, being consummated by admission into the Union, they stand on an equal footing with the people of other states; and the state thus organized ought to be admitted into the federal Union, whether its constitution prohibits or recognizes the institution of slavery." The regular convention assembled in Baltimore pursuant to adjournment, and nominated Stephen A. Douglas of Illinois for president and Benjamin Fitzpatrick of Alabama for vice president, though a further withdrawal of delegates took place. Mr. Fitzpatrick subsequently declined, and Herschel V. Johnson of Georgia was substituted by the national committee. The convention called by the seceding delegates met first at Richmond, but adjourned, and convened finally at Baltimore on June 23, when it adopted the Charleston platform and nominated John C. Breckinridge of Kentucky for president and Joseph Lane of Oregon for vice president. The "Constitutional Union" party, composed mainly of the American party, held its national convention at Baltimore May 9, and nominated for president John Bell of Tennessee, and for vice president Edward Everett of Massachusetts. This party declared that it recognized "no political principle other than the constitution of the country, the union of the states, and the enforcement of the laws." The republican national convention assembled at Chicago on May 16, and nominated for president Abraham Lincoln of Illinois, and for vice president Hannibal Hamlin of Maine. The portion of the platform adopted by the convention relating to slavery was as follows: "That the maintenance of the principle promulgated in the Declaration of Independence and embodied in the federal constitution, 'that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness; that to secure these rights governments are instituted among men, deriving their just powers from the consent of the governed,' is essential to the preservation of our republican institutions; and that the federal constitution, the rights of the states, and the union of the states, must and shall be preserved. That the maintenance inviolate of the rights of the states, and especially the right of each state to order and control its own domestic institutions according to its own judgment exclusively, is essential to that balance of powers on which the perfection and endurance of our political fabric depend; and we denounce the lawless invasion by armed force of the soil of any state or territory, no matter under what pretext, as among the gravest of crimes. That the new dogma that the constitution, of its own force, carries slavery into any or all of the territories of the United States, is a dangerous political heresy, at variance with the explicit provisions of that instrument itself, with contemporaneous exposition, and with legislative and judicial precedent; is revolutionary in its tendency, and subversive of the peace and harmony of the country. That the normal condition of all the territory of the United States is that of freedom; that, as our republican fathers, when they had abolished slavery in all our national territory, ordained that 'no person should be deprived of life, liberty, or property, without due process of law,' it becomes our duty, by legislation whenever such legislation is necessary, to maintain this provision of the constitution against all attempts to violate it; and we deny the authority of congress, of a territorial legislature, or of any individuals to give legal existence to slavery in any territory of the United States." In the presidential election of Nov. 6, 1860, Mr. Lincoln received the electoral votes of all the free states (except three votes in New Jersey, which were given to Mr. Douglas), to the number of 180, and was elected. Mr. Bell received the votes of Virginia, Kentucky, and Tennessee, 39; Mr. Douglas the 9 votes of Missouri, which added to 3 from New Jersey gave him a total of 12 votes; and the remaining southern states cast their 72 electoral votes for Breckinridge. The popular vote for Lincoln was 1,866,452; for Douglas, 994,139; for Breckinridge, 669,082; for Bell, 575,193; and 575,327 votes were cast for fusion tickets opposed to Lincoln. The total vote was 4,680,193. When this result became known, the legislature of South Carolina ordered the election of a convention to consider the question of secession. The convention assembled Dec. 17, and on Dec. 20 unanimously adopted a secession ordinance, declaring that "the union now subsisting between South Carolina and other states, under the name of the United States of America, is hereby dissolved." The alleged reason for this action was hostility on the part of the successful party to the institution of slavery. Before the end of May, 1861, 11 states had passed ordinances of secession, in the following order: South Carolina, Mississippi, Florida, Alabama, Georgia, Louisiana, Texas, Virginia, Arkansas, Tennessee, and North Carolina. The western portion of Virginia refused to be bound by the ordinance of that state, and in 1863 was admitted into the Union as a separate state under the name of West Virginia. In eastern Tennessee also the prevailing sentiment continued favorable to the Union. On Feb. 4, 1861, a congress, composed of delegates from the states that had then seceded, assembled at Montgomery, Ala., and framed a constitution for the "Confederate States of America." Jefferson Davis of Mississippi was chosen president, and Alexander H. Stephens of Georgia vice president; a government was organized, and measures were taken to create an army. The senators and representatives from the seceded states withdrew from the United States congress. Nothing was done by President Buchanan's administration to thwart the purposes of the secessionists, who proceeded to seize the arsenals, custom houses, navy yards, and forts throughout the south. At the close of his term only Fort Sumter at Charleston, S. C., and Fort Pickens at Pensacola, Fla., with the posts on the Florida keys, remained in the possession of the government in the seven states that had then seceded. Various measures were proposed looking to conciliation, but without effect. For details of these, as well as of the progress of secession and the organization of the confederacy, see CONFEDERATE STATES OF AMERICA. In his inaugural address, March 4, 1861, President Lincoln declared that the accession of a republican administration afforded no ground to the southern states for apprehending any invasion of their rights, and that the power confided to him would be used "to hold, occupy, and possess the property and places belonging to the government, and collect the duties and imposts; but, beyond what may be necessary for these objects, there will be no invasion, no using of force against or among the people anywhere." "The course here indicated will be followed, unless current events and experience shall show a modification or change to be proper." (See LINCOLN, ABRAHAM.) He appointed as his cabinet William H. Seward, secretary of state; Salmon P. Chase, of the treasury; Simon Cameron, of war; Gideon Welles, of the navy; Caleb B. Smith, of the interior; Edward Bates, attorney general; and Montgomery Blair, postmaster general. The last two were from the slave states of Missouri and Maryland. In 1862 Cameron was succeeded by Edwin M. Stanton (Jan. 14) and Smith by John P. Usher; in 1864 Chase was succeeded by William P. Fessenden, Blair by William Dennison, and Bates by James Speed. Upon Lincoln's second inauguration (1865) Hugh McCulloch succeeded Fessenden. The army at the beginning of active measures on the part of the south was only 16,000 strong (on Jan. 1, 1861, it consisted of 16,402 officers and men, of whom 14,657 were present for duty), and by orders from Mr. Floyd, the secretary of war, who was himself a party to the secession movement, had been dispersed in the remotest parts of the country, while the navy was mostly absent on foreign stations. Under Floyd's orders also an extensive transfer of arms and ammunition from northern to southern arsenals was made during 1860. Before the inauguration of Mr. Lincoln Gen. Twiggs, commanding in Texas, had surrendered to the Texan authorities half the military force of the Union. Most of the army and many of the navy officers from the south resigned upon the secession of their states. The first warlike act was the bombardment by the confederates, under Gen. Beauregard, of Fort Sumter, which was commanded by Major Anderson with a garrison of 109 men. Fire was opened on April 12, 1861, and continued on the 13th, and Major Anderson was compelled to evacuate the fort on the 14th, sailing with his garrison to

New York. (See SUMTER, FORT.) The next day (April 15) President Lincoln issued a proclamation calling upon the governors of the several states for a force of 75,000 militia for three months. The utmost enthusiasm was aroused throughout the north. On the evening of the 16th several companies from Pennsylvania reached Washington, and on the 17th the 6th regiment of Massachusetts started for that city. On the 19th, in company with ten companies from Philadelphia, it reached Baltimore, where it was attacked by a party of secessionists, and three of its members were killed and eight seriously injured. The Philadelphia troops were compelled to return, but the 6th Massachusetts proceeded to Washington. On the 25th several other regiments reached that city. On May 13 Gen. B. F. Butler took military possession of Baltimore, repressing the secession element in that city. In the mean time the United States arsenal at Harper's Ferry (April 18), and the Gosport navy yard, near Norfolk, Va. (April 21), fell into the hands of the confederates. On April 19 and 27 the president issued proclamations declaring a blockade of the ports of the seceded states. On April 15 he called an extra session of congress to meet on July 4. This body made large appropriations for the organization and support of the army and navy, which were continued by subsequent congresses. Various loans were authorized and other financial measures adopted during the struggle, to which reference has been made in a previous portion of this article. The states and subordinate political bodies also promptly raised large sums in aid of the war, and did not relax their efforts till its close. Bounties were offered to soldiers enlisting, by the United States and by state and local authorities. On May 3, 1861, a second call was made by the president for 42,034 volunteers for three years, 22,714 men for the regular army, and 18,000 seamen. The acts of July 22, 25, and 31 authorized the president to accept not exceeding 1,000,000 volunteers for periods of from six months to three years. No formal call was made, but men came forward promptly under these acts, which were regarded in the apportionment of quotas as a call for 500,000 men for three years. On July 2, 1862, a call was made for 300,000 volunteers for three years, and on August 4 a draft was ordered of 300,000 men for nine months, to be made by the state authorities from the militia. On March 3, 1863, an act was passed providing for the enrolment and drafting of the military forces of the Union, and creating in the war department the bureau of the provost marshal general to carry it into effect. A draft was commenced under its provisions in July, which resulted in little direct benefit to the army, but served greatly to stimulate volunteering. This draft gave rise to severe riots in New York, continuing three days. On Oct. 17 a call was made for 300,000 volunteers for three years, followed by others on Feb. 1 and March 14, 1864, for 200,000 each for the same period. In April a draft was commenced to supply the deficiencies in these calls. On July 18 a call was made for 500,000 men for one, two, and three years, and on Dec. 19 another for 300,000 for the same periods; and these calls were followed by drafts. Recruiting was ordered to be discontinued on April 13, 1865. Simultaneously with the organization of the army measures were taken to enlarge the navy, which for service against the confederacy was largely recruited by the purchase of steamers and other vessels from the merchant marine.—On May 24, 1861, the national forces took possession of Arlington heights and Alexandria on the Potomac, opposite Washington. On the 27th federal troops under Gen. McClellan entered western Virginia. They soon obtained control of that part of the state, and at the close of the year scarcely any armed confederates were found W. of the Alleghanies in Virginia. On July 21 was fought the battle of Bull Run, near Manassas Junction, Va., the first of any magnitude during the war, in which the Union forces under Gen. McDowell were defeated by the confederates under Gen. Beauregard, and fell back in disorder to Washington. (See BULL RUN.) Soon after Gen. McClellan was placed in command of the army of the Potomac, and began to reorganize and discipline his forces, in which occupation the rest of the summer and the following winter were quietly passed. On Aug. 29 Forts Hatteras and Clark, at Hatteras inlet, the main entrance to Pamlico sound on the coast of North Carolina, were taken by a military and naval expedition under Gen. Butler and Com. Stringham. On Oct. 29 a fleet of 75 vessels under command of Com. Du Pont, with transports conveying 10,000 men under Gen. T. W. Sherman, sailed from Hampton roads, and on the night of Nov. 3 arrived off Port Royal, S. C. On the 7th they attacked Forts Beauregard and Walker at the entrance of the harbor, and after a bombardment of nearly five hours put the garrisons to flight, thus securing the finest harbor on the southern coast. Meantime troops in aid of the confederacy had been organized in Missouri, and others had come in from Arkansas and Texas. On Aug. 10 a battle was fought at Wilson's creek, near Springfield, in the S. W. part of Missouri, between the confederates under Gen. McCulloch and the federals under Gen. Lyon. The former lost 265 killed, 800 wounded, and 30 missing; the latter 223 killed (including Gen. Lyon), 721 wounded, and 292 missing. After the battle the Union army, under Col. Sigel, fell back to Rolla in the central portion of the state. Gen. Fremont, having been appointed to the command of the western department, took the field in Missouri near the end of September, and by degrees drove the confederates under Gen. Price back to the S. W. corner of the state; but on Nov. 2 he was superseded by Gen. Hunter. The federal army again fell back to Rolla, the confederates advancing as it receded. On the 12th Gen. Halleck took command of the department, and by the end of December Price was again in full retreat toward Arkansas, losing within a few days 2,500 prisoners and a large amount of stores. A conspicuous incident of the struggle in Missouri was the defence of Lexington, on the Missouri river, against a greatly superior force, by 2,780 men under Col. Mulligan, who surrendered (Sept. 21) only after being three days cut off from water. About Oct. 1 the confederate army before Washington began to fall back, and the national lines to be pushed forward. On the 21st a portion of Gen. Stone's command, having crossed the Potomac at Ball's bluff, about midway between Harper's Ferry and Washington, was disastrously defeated by the confederate general Evans, with a loss of 1,000 out of 1,900 men. Col. Baker, United States senator from Oregon, was among the killed. On Oct. 31 Winfield Scott, general-in-chief of the armies of the United States, retired from active service, and was succeeded by Gen. McClellan. On Nov. 8 Capt. Wilkes, in command of the frigate San Jacinto, intercepted the British mail steamer Trent, from Havana for Southampton, and forcibly took from on board Messrs. Mason and Slidell, commissioners from the southern confederacy to England and France. The action was resented by the British government, and produced a great display of feeling against the United States. A war with England seemed imminent, when the president decided to surrender the commissioners to the British minister. On Dec. 20 Brig. Gen. Ord routed the confederates with heavy loss at Dranesville, on the road from Washington to Leesburg. In the west, Bishop Polk of Louisiana, serving as major general in the confederate army, had occupied Hickman and Columbus, Ky., on the Mississippi, and begun to fortify them. Gen. Grant, commander of the federal forces at Cairo, Ill., consequently took possession (Sept. 6) of Paducah, on the Ohio just below the mouth of the Tennessee. About the same time Gen. Zollicoffer led a confederate force from Tennessee into S. E. Kentucky. This was subsequently placed under Gen. G. B. Crittenden, and was defeated on Jan. 19, 1862, by Gen. G. H. Thomas at Mill Spring, Zollicoffer himself being killed. On Feb. 6 the federal commodore Foote, with a fleet of gunboats from Cairo, reduced Fort Henry on the E. bank of the Tennessee river in Tennessee; and on the 16th Fort Donelson, on the W. bank of the Cumberland, surrendered with about 13,000 men after some severe fighting to Gen. Grant. (See FORT DONELSON AND FORT HENRY.) On the 15th Gen. Mitchel, advancing from Louisville, had occupied Bowling Green, Ky., a place of great natural strength, the confederate forces under Gen. A. S. Johnston retiring to Nashville, Tenn. That city was occupied by the federal forces on the 26th, Gen. Johnston retreating as far as Corinth, Miss.; and on March 2 Columbus, Ky., was evacuated by the confederates. The whole of Kentucky and a part of Tennessee were thus secured by the federal arms. To command the Mississippi, the confederates had fortified island No. Ten in a sharp bend of that river, a few miles above New Madrid, Mo., which was also fortified and defended by a confederate force. On March 3 Gen. Pope invested the town, which he took possession of on the 14th, the confederates having abandoned it during the preceding night, leaving 33 guns and a large quantity of small arms, ammunition, &c. Com. Foote, having in the mean time moved a fleet of gunboats down the river, opened on the island on the 15th. Two of the gunboats succeeded in running past it; and a canal 12 m. long having been cut through a peninsula on the Missouri side, enabling the fleet to get below it, Gen. Pope on April 7 crossed a portion of his troops to the E. side. The confederates, thus cut off from retreat, surrendered during the following night, and nearly 7,000 prisoners, 123 cannon, 7,000 stand of small arms, and an immense quantity of stores fell into the hands of the federals. The federal fleet proceeded down the river, and after some opposition from forts and gunboats received the surrender of Memphis on June 6. The command was now devolved on Com. Davis, Com. Foote having been disabled by a wound. The fleet continued its course down the river, reaching Vicksburg, Miss., before the end of June, where the first serious obstacle was encountered. In the mean time the federal forces under Gen. Grant had advanced from Fort Donelson up the Tennessee river, and when encamped in the vicinity of Shiloh church, Tenn., near Pittsburgh Landing on the river, were attacked by the confederates under Gens. A. S. Johnston and Beauregard, who had advanced from Corinth, about 20 m. distant. The battle, which at first threatened to overwhelm the federals, raged two days (April 6 and 7), when the confederates fell back to Corinth, leaving the field in the possession of the Union army. (See SHILOH.) After the battle Gen. Halleck assumed command of the Union army, and with augmented forces operated against Corinth, which the confederates evacuated on May 29. About the same time Gen. Mitchel entered N. Alabama, capturing Huntsville and other points, and destroying much confederate property. A confederate force had entered New Mexico from Texas early in 1862, but they were driven out before the close of the spring, and subsequently that territory was unmolested. A victory was gained by the national forces under Gen. Curtis at Pea Ridge, Ark., March 7 and 8, over the armies of Van Dorn, Price, and McCulloch, which had just been driven out of Missouri. Gen. Curtis subsequently met with little resistance, and in July occupied Helena on the Mississippi. During the latter half of the year there were numerous conflicts in Missouri and Arkansas between small forces of confederates and federals, the advantage being in favor of the latter. The battle of Prairie Grove, Ark., was fought on Dec. 7, the Union forces being commanded by Gens. Herron and Blunt, and the confederates by Gen. Hindman. The latter retreated during the ensuing night, leaving the federals in possession of the field. Ship island, about 10 m. from the coast of Mississippi, had been occupied in the latter part of 1861, and here troops were collected for the capture of New Orleans, to be under the command of Gen. Butler, who reached the island March 25, 1862. New Orleans was defended by Forts Jackson and St. Philip, on opposite sides of the Mississippi, about 83 m. below the city. Both of these works were of great strength, and between them the passage had been barred by chains and hulks. On April 18 a bombardment was commenced by a federal fleet of 47 vessels, carrying 289 guns and 21 mortars, the whole commanded by Capt. Farragut, the mortar fleet being under the special command of Capt. Porter. On the morning of the 24th, the barriers having been previously removed, Capt. Farragut ran past the forts with a part of his fleet, destroyed a squadron of the enemy's rams and gunboats, silenced the batteries above the forts, and reached New Orleans on the 25th. Gen. Lovell, in command of the confederate troops, evacuated the city on his arrival, and destroyed all the cotton, sugar, and other valuable stores. Forts Jackson and St. Philip surrendered to Capt. Porter on the 28th. Gen. Butler now moved up with his army, took formal possession of New Orleans (May 1), and placed it under martial law. Farragut's fleet passed up the river, captured Baton Rouge, and afterward proceeded to Vicksburg, the only remaining stronghold of the confederates on the Mississippi, of which a bombardment was begun on June 26. On the morning of the 28th Capt. Farragut with seven vessels passed the city, and joined Capt. Davis's flotilla from Memphis. The siege of Vicksburg was abandoned about the end of July, Capt. Farragut, who had repassed the batteries, dropping down the river with his fleet. On Aug. 5 the confederate Gen. Breckinridge was repulsed in an attack on Baton Rouge by Gen. Williams, who fell at the moment of victory. In December Gen. Butler was superseded by Gen. Banks. Another expedition, under the command of Gen. Burnside and Com. Goldsborough, sailed from Hampton roads Jan. 12, 1862, entered Pamlico sound by way of Hatteras inlet, and attacked Roanoke island, which the confederates had strongly fortified. The troops landed Feb. 7, and on the following day stormed the intrenchments, and obliged about 2,700 of the enemy to surrender. On the 9th the fleet passed up the sound to Elizabeth City, N. C., and destroyed the confederate flotilla. On March 14 Gen. Burnside captured New Berne after a severe battle, taking 500 prisoners and 69 guns, and immediately afterward marched a force thence to Beaufort, which made no resistance; but Fort Macon, which defended the entrance to it from the sea, held out until April 25. Washington, Plymouth, and other towns on the coast were also occupied. On April 11 Fort Pulaski, on Cockspur island at the mouth of the Savannah river, was reduced by bombardment from batteries on Tybee island. On March 8 the confederate ironclad Virginia (formerly Merrimack), coming out from Norfolk, attacked the federal fleet in Hampton roads, and destroyed the frigates Cumberland and Congress. During the ensuing night the ironclad Monitor, under command of Lieut. Worden, arrived from New York, and in the morning engaged the Virginia, which retired after a protracted contest. (See HAMPTON ROADS.) On May 10 Norfolk was occupied without resistance by a detachment from Fortress Monroe under Gen. Wool, and the Virginia was blown up to prevent it from falling into his hands. In June, 1862, Gen. Buell left Corinth, Miss., and moved east, threatening Chattanooga, Tenn. Gen. Bragg, in command of the confederates, thereupon moved from Tupelo, Miss., through N. Alabama and Georgia, reaching Chattanooga in advance of Buell. Toward the end of August he started on an invasion of Kentucky, which his forces entered from E. Tennessee. On the 30th a corps under Kirby Smith encountered a raw Union force under Gen. Manson at Richmond, Ky., and totally defeated it with a loss of several thousand in disabled and prisoners. Lexington was occupied on Sept. 4. On the 17th Bragg captured Munfordsville, with the Union force there of about 2,000 men under Col. Wilder, and on Oct. 1 entered Frankfort. In the mean time Buell had marched by way of Nashville, which he left strongly garrisoned, to Louisville, where his army arrived between Sept. 25 and 29. On Oct. 1 he began to move against Bragg, who slowly retreated to Perryville, where he made a stand, and on the 8th a battle ensued, in which the confederates lost 2,500 men and the federals more than 4,000. During the succeeding night Bragg continued his retreat, and joining Kirby Smith passed into E. Tennessee. On the 30th Buell was superseded by Maj. Gen. Rosecrans. The confederates under Gen. Price having occupied Iuka, Miss., Gen. Rosecrans attacked that place on Sept. 19, and severe fighting ensued, which was ended by darkness. During the succeeding night Price retreated, and at Ripley united with a stronger confederate force under Gen. Van Dorn, who soon advanced against Corinth, now defended by Gen. Rosecrans. The attack was commenced on Oct. 3, and ended on the following day with a strong and determined assault, which was repulsed with great loss, the federal pursuit continuing as far as Ripley. (See CORINTH, vol. v., p. 354.) Gen. Rosecrans, having assumed command in Kentucky, began on Nov. 10 to move to Nashville. On Dec. 26 he began to march thence upon Murfreesboro, where Bragg's forces were concentrated; he encountered some opposition, and reached Stone river near that place on the 29th and 30th. Here bloody engagements occurred, Dec. 31, 1862, and Jan. 2, 1863, which resulted in the abandonment of Murfreesboro by the confederates during the night of Jan. 3–4. (See MURFREESBORO.) The other operations in this vicinity during the winter and spring were confined to cavalry raids. On Nov. 28, 1862, Gen. Grant, in command in W. Tennessee, commenced an advance into Mississippi with the design of operating against Vicksburg. He had reached Oxford when, on Dec. 20, a blow was struck at his communications in the capture of Holly Springs by Van Dorn, who took more than 1,000 prisoners and destroyed a vast quantity of munitions and stores, compelling Grant to abandon the movement. On Oct. 8 Galveston, Texas, was occupied by a naval force, and was held till Jan. 1, 1863, when it was retaken by Gen. Magruder.—Operations of greater magnitude had in the mean while taken place on the eastern theatre of the war. About April 1, 1862, Gen. McClellan, who now had command only of the department of the Potomac, transferred his forces to Fortress Monroe, and began a movement upon Richmond up the peninsula between the York and James rivers. On the 4th an advance was made upon Yorktown, which was besieged for a month, when it was abandoned by the confederates. McClellan then continued his advance, and a series of bloody battles was fought, viz.: at Williamsburg, May 5; Hanover Court House, May 27; Seven Pines and Fair Oaks, May 31 and June 1; Mechanicsville, June 26; Cold Harbor, June 27; Savage's Station, June 29; Frazier's Farm, June 30; and Malvern Hill, July 1, on the James. During the night of July 1 Gen. McClellan withdrew his troops to Harrison's Landing, 7 m. below Malvern Hill, where he remained till about the middle of August, when his army was transferred to the Potomac. The confederate army in this campaign was at first commanded by Gen. Joseph E. Johnston, who was succeeded by Gen. Robert E. Lee. Soon after the battle of Malvern Hill it retired to Richmond, to assume the offensive against Washington. (For a detailed account of the peninsular campaign, see CHICKAHOMINY.) In the mean time a confederate force under Gen. "Stonewall" Jackson and federal forces under Gens. Banks and Fremont had been operating in the Shenandoah valley. (See CROSS KEYS.) Several battles were fought, and about the middle of June Jackson was summoned with the greater part of his force to Richmond. In July Gen. Pope was placed in command of the federal army of Virginia, consisting of the forces that had been operating in the valley and of those under Gen. McDowell covering Washington. About the same time Gen. Halleck was summoned from the west to act as general-in-chief at Washington. On Aug. 9 a portion of Pope's army under Banks was repulsed with loss at Cedar mountain, near Culpeper Court House, by a superior body of confederates under Jackson, who formed the van in Lee's offensive operations. On Aug. 29 and 30 occurred the second battle of Bull Run, between the Union army under Pope and the confederate forces under Jackson and Longstreet, in which the latter had the advantage. (See BULL RUN.) Pope retreated within the defences of Washington and resigned, Gen. McClellan assuming command of the remnant of his army. Lee moved to the Potomac above Washington and crossed into Maryland. McClellan soon started to meet him, and encountered portions of the enemy on Sept. 14 at Turner's and Crampton's gaps in the South mountain, from which they were driven after severe fighting. The next day Harper's Ferry, with 11,583 men, 73 guns, 13,000 small arms, and other stores, was surrendered to a detachment of Lee's army under Jackson. McClellan, advancing, found Lee on the 15th strongly posted across Antietam creek near the village of Sharpsburg, where on the two following days a bloody but indecisive battle was fought. (See ANTIETAM, BATTLE OF.) On the night of the 18th Lee retreated into Virginia. McClellan crossed the Potomac about Nov. 1, and advanced to Warrenton, near the Rappahannock. On the 7th he was directed to turn over the command to Gen. Burnside, who moved down the Rappahannock to Fredericksburg, which was summoned without effect on the 21st. Lee had made a parallel movement down the S. bank of the river, and strongly intrenched himself on the bluffs behind the town. On Dec. 13 Burnside crossed the river and made repeated attacks on the enemy's position, but was repulsed with great slaughter, and on the 15th returned to the N. bank. (See FREDERICKSBURG, BATTLE OF.) On Jan. 26, 1863, Burnside was superseded by Gen. Joseph Hooker. About the close of April Hooker began to cross the Rappahannock, and concentrated his forces at Chancellorsville, where a bloody engagement ensued, May 2–4, in which the Union army was worsted by the forces under Lee, Hooker recrossing to the N. side of the river. In this battle Jackson was mortally wounded. (See CHANCELLORSVILLE, BATTLE OF.) About the beginning of June Lee, again assuming the offensive, advanced into the Shenandoah valley, capturing Winchester on the 15th, whence he drove a federal force under Gen. Milroy, taking many prisoners. The main body of the confederate army crossed the Potomac above Harper's Ferry, June 24–25, and marching across Maryland entered Pennsylvania. Hooker had begun on June 13 to move north, so as to cover Washington, and on the 26th crossed the Potomac about half way between Washington and Harper's Ferry, advancing to Frederick, Md. On the following day he resigned his command, in consequence of a difference with Gen. Halleck respecting the disposition of a force at Maryland Heights opposite Harper's

Ferry, and on the 28th was succeeded by Gen. Meade. The latter advanced into Pennsylvania, and on July 1, 2, and 3 the two armies met in the great battle of Gettysburg, which ended in the discomfiture of the confederate army. (See GETTYSBURG, BATTLE OF.) On the 4th Lee began his retreat, and on the 13th recrossed the Potomac at one of the points where he had crossed on his advance. Meade crossed a little below Harper's Ferry on the 18th, and reached Warrenton on the 25th, where he was soon confronted by Lee on the other side of the Rappahannock. Few important movements were made by either army during the remainder of the year, and the campaign of 1863 closed with the abortive attempt of Meade upon Lee's position on Mine run, a small affluent of the Rapidan, at the end of November.—About Dec. 20, 1862, Gen. W. T. Sherman with 30,000 men proceeded down the Mississippi from Memphis, and on the 29th assaulted the fortifications and batteries commanding Vicksburg from the north. The assault was repelled with a loss of nearly 2,000, and the forces a few days after were withdrawn to Milliken's Bend, where on Jan. 4, 1863, Gen. McClernand assumed command. An expedition into Arkansas was immediately undertaken for the capture of Fort Hindman at Arkansas Post on the Arkansas river, which was reduced on the 11th, the federals suffering a loss of 977 and capturing 17 guns, several thousand prisoners and small arms, and a large quantity of munitions and stores. Returning from this expedition, the forces were moved down the Mississippi, and on the 22d landed at Young's Point on the W. bank, about 9 m. above Vicksburg, where Gen. Grant arrived and assumed chief command, Feb. 2. Two months were now spent in unavailing attempts to flank the defences of Vicksburg by means of a canal at this point and through various bayous. Finally, a part of Admiral Porter's fleet and several transports having run past the batteries of Vicksburg and Warrenton and Grand Gulf below, a portion of Grant's army, which had marched down the W. bank of the Mississippi, crossed the river on April 30. Grand Gulf, being thus taken in the rear, was abandoned on May 3, and a few days after Grant was joined by Sherman's corps, which had remained above Vicksburg. An advance was then made up the left bank of the Big Black river, encountering some opposition at Raymond (May 12) and Jackson (May 14). On the 16th a battle was fought at Champion Hills, between Jackson and Vicksburg, by Grant's forces, against Gen. Pemberton, who had marched out of Vicksburg with the design of taking Grant in the rear. Pemberton was driven back with loss, and retreated to the Big Black river, across which he was driven the following day. The federal forces then advanced upon Vicksburg, and on the 19th the investment was complete. Porter immediately obtained control of the Yazoo river. On the 19th and 22d unsuccessful assaults were made, in the latter of which the loss was nearly 3,000. On July 3, the last day of the battle of Gettysburg, Gen. Pemberton, reduced by famine, surrendered with 27,000 men, and on the 4th Grant occupied the city. The result of this campaign rent the confederacy in twain, and was the severest blow it had yet received. On July 16 Gen. Sherman drove out of Jackson Gen. Joseph E. Johnston, who during the siege had been operating in the rear of Grant. On July 3 Helena, Ark., held by Gen. Prentiss with 3,800, was attacked by about 7,700 confederates under Gen. Holmes, who were repulsed with a loss of nearly 1,700. In Louisiana Gen. Banks invested Port Hudson on the Mississippi in May, 1863, and on the 27th made an assault which was repulsed with a loss of about 1,850 men. The place was then closely besieged, and surrendered on July 8 with 6,408 men. Other operations were carried on during the year in Louisiana between Gens. Banks and Taylor, but they were not decisive. Early in September an expedition under Gen. Franklin, consisting of 4,000 men and several gunboats, was despatched from New Orleans to proceed against Houston, Texas, by way of Sabine pass; but the gunboats, being disabled in an attack on the fortifications at Pass Franklin, returned to New Orleans. On Oct. 26 a new expedition, consisting of 6,000 men under Banks, started for the Rio Grande, and landed at Brazos Santiago Nov. 2. Having taken possession of Brownsville and other points in W. Texas, Banks left Gen. Dana in command and returned to New Orleans. After abandoning Murfreesboro, Bragg had concentrated the greater part of his forces at Shelbyville and Tullahoma, where they were strongly intrenched. Rosecrans remained quietly at Murfreesboro till June 23, 1863, when he advanced, and took possession of Shelbyville on the 27th and of Tullahoma on the 30th, forcing Bragg to retreat to Chattanooga. The federal advance reached the Tennessee river Aug. 21, and by Sept. 8 the army was all across the stream, concentrating at Trenton, Ga., some miles S. of Chattanooga, which was occupied by a detachment the next day, Bragg retiring into Georgia and posting his troops in the vicinity of Chickamauga creek, E. of Trenton. Here, Sept. 19 and 20, occurred a severe engagement, in which the federals were worsted and fell back to Chattanooga, where they were besieged by Bragg. (See CHICKAMAUGA, BATTLE OF.) On Oct. 23 Gen. Grant arrived and took command. Reënforcements under Hooker had previously arrived from the east, and others from the west under Sherman came subsequently. A series of movements was at once initiated, which after much hard fighting resulted in driving Bragg from Chattanooga (Nov. 25) and forcing him to retreat into Georgia. (See CHATTANOOGA.) Gen. Burnside, after being relieved from command on the Rappahannock, had been assigned to the command of the department of the Ohio, and having organized a force of about 20,000 men at Camp Nelson near Richmond, Ky., began on Aug. 16 an advance on Knoxville, which was occupied on Sept. 1. East Tennessee, where the army was enthusiastically received by the population, was thus restored to the control of the Union with little opposition, the greater part of the confederate forces having been withdrawn to aid Bragg at Chickamauga. On Nov. 17 Longstreet, with forces drawn from Bragg, began a siege of Knoxville, which continued till the beginning of December, when, upon the approach of Sherman to the relief of the city, the confederates retreated into Virginia. A confederate cavalry force under Gen. Morgan, starting on June 27 from Sparta, Tenn., had made a raid, which created great excitement, through Kentucky and S. Indiana into Ohio, where before the end of July they were nearly all captured or destroyed. On Aug. 10 Gen. Steele set out from Helena, Ark., with 12,000 men and 40 guns, for the capture of Little Rock, and, advancing against some opposition, occupied that city on Sept. 10. Other operations in Arkansas and Missouri during the year were of minor importance. On April 6 an attack was made on Charleston by a fleet of ironclads under Com. Du Pont, which was repelled by the fire of Fort Sumter. On July 10 a force was landed by Gen. Gillmore, then in command in South Carolina, on Morris island at the entrance of Charleston harbor, and on the following day an ineffectual attack was made on Fort Wagner, a strong earthwork at its N. end. On the 18th an assault was made in force, which was repulsed with a loss of 1,500 men. The fort was then besieged by regular approaches, and was abandoned on Sept. 7. It was afterward, with other batteries on the island, turned against Charleston, which was nearly destroyed by the bombardment. On the night of Sept. 8 an attempt to carry Fort Sumter by assault was made by a flotilla of boats from Admiral Dahlgren's fleet, which was repulsed with a loss of about 80 killed and wounded and 120 prisoners. The principal occurrence in North Carolina during 1863 was the ineffective siege of the town of Washington in the early part of April by a confederate force under Gen. D. H. Hill. An effort in February, 1864, to restore Florida to the Union by an expedition from Hilton Head, under Gen. Seymour, resulted disastrously. Landing at Jacksonville, he advanced west, and at Olustee on the 20th encountered a confederate force under Gen. Finnegan and was compelled to retreat to Jacksonville. Of about 5,000 men engaged, Seymour lost about 1,500 in killed and wounded; the confederate loss was less than 1,000. On April 20 Plymouth, N. C., was compelled to surrender to a confederate force under Gen. Hoke (see Plymouth), and as a consequence Washington was evacuated by the federals eight days later. On May 5 the confederate ironclad Albemarle, which had taken part in the attack on Plymouth, came out of the Roanoke river and was engaged by the gunboat Sassacus. Having received considerable injury, the Albemarle retreated up the river, and on Oct. 27 was sunk by a torpedo under the direction of Lieut. Cushing. On Oct. 31 Plymouth was retaken by the federal fleet. West of the Mississippi, the most important movement in 1864 was Banks's disastrous Red river campaign in the early spring. (See Louisiana, vol. x., p. 678, and Red River, vol. xiv., p. 237.) In Arkansas Gen. Steele moved S. from Little Rock, March 23–24, with 7,000 men, for the purpose of coöperating with Banks, and advanced as far as Camden on the Washita river, when, receiving news of the failure of Banks, he began a retreat on April 27, reaching Little Rock May 2. During this movement Steele had been repeatedly annoyed by the confederates, the most important engagements being at Marks's mill on April 25, when a detachment of three regiments was captured after a stout resistance by a superior force under the confederate Gen. Fagan, and at Jenkins's ferry on the Saline river, April 30, when a powerful attack by Kirby Smith was repulsed with great loss. In September and October Gen. Price with a considerable force made a raid through Missouri. Entering the state at the S. E. corner from Arkansas, he passed N. W. through the centre past Jefferson City to Lexington and Independence, whence he was driven south, escaping into W. Arkansas with a loss of 10 guns, much material, and nearly 2,000 prisoners. On April 12 Fort Pillow, on the Mississippi about 40 m. above Memphis, garrisoned by about 550 men, of whom half were colored, was taken by assault by the confederates under Gen. Forrest, and many of the garrison as well as non-combatants were killed after the capture. Gen. Sturgis with 12,000 men, being sent after Forrest, who was retreating, came up with and was routed by him at Guntown in N. Mississippi on June 10. Sturgis lost 3,000 or 4,000 men, mainly prisoners, and retreated to Memphis, pursued by Forrest. Another force of 12,000 men under Gen. A. J. Smith was then sent against Forrest, by which he was defeated with great loss at Tupelo, Miss., on July 14. In August Forts Gaines and Morgan, commanding the entrance to Mobile bay, were reduced by a fleet under Admiral Farragut, aided by a land force under Gen. Granger, and the confederate fleet there was destroyed. (See Mobile.)—Early in March, 1864, Gen. Grant was appointed lieutenant general and invested with the chief command of the Union armies, Gen. Halleck being relieved and assigned to duty in Washington as chief of staff to the army. Gen. Grant announced that his headquarters would be with the army of the Potomac in the field. On May 4 he began to cross the Rapidan and advance into the "Wilderness," a region on the S. bank of that stream in Orange and Spottsylvania counties.

Here (May 5 and 6) and at Spottsylvania Court House near by (May 8-21) followed a series of sanguinary engagements. (See WILDERNESS, BATTLES OF THE.) Grant then advanced by a series of flank movements to the Chickahominy, where on June 3 occurred the second battle of Cold Harbor, in which the federal assault on the confederate position was repulsed with great loss. (See CHICKAHOMINY, vol. iv., p. 416.) On the 12th, having determined to attack Richmond from the south, he began to move, crossing the Chickahominy below Lee's position, and effecting the passage of the James June 14-15. Lee thereupon retired within the intrenchments covering Richmond. On the 15th and 16th a part of the Union forces unsuccessfully assailed Petersburg, and on the 19th Grant began a regular siege. On July 30, a mine having been exploded, another attack was made, which was repulsed with loss. The siege of Petersburg and Richmond continued till April 3, 1865, when, after Lee's defeat at Five Forks (March 31, April 1), those places were occupied by the federals, having been evacuated by Lee during the preceding night. Grant vigorously pursued the retreating army, and at Appomattox Court House on the 9th compelled Lee to surrender the remnant of his forces, about 27,000 in all, an event which virtually terminated the war. (See PETERSBURG, SIEGE OF.) Simultaneously with Grant's advance on Richmond, Gen. Sigel moved up the Shenandoah valley, and Gen. Crook from Charleston, W. Va., up the Kanawha valley. On May 15, 1864, Sigel was routed at Newmarket by Gen. Breckinridge, losing 700 men, 6 guns, and 1,000 small arms. Gen. Hunter, having superseded Sigel and having been somewhat strengthened, resumed the offensive. He was opposed by Gen. Jones, Breckinridge having been withdrawn to Richmond. The two armies met at Piedmont, near Staunton, June 5, when Jones was routed, losing 1,500 prisoners, 3 guns, and 3,000 small arms. Hunter advanced to Staunton, where he was joined by Crook, and advanced thence via Lexington on Lynchburg. Gen. Early being sent to the relief of this city from Richmond, Hunter retreated into West Virginia. Early then moved north, and on July 2-3 appeared on the Potomac. Crossing into Maryland, he threatened Washington and Baltimore, being stoutly but ineffectually opposed on the 9th by an inferior force under Gen. Wallace on the Monocacy river near Frederick, Wallace losing nearly 2,000 men in killed, wounded, and missing. Washington was saved by the timely arrival of troops ordered there by Gen. Grant. Early recrossed into Virginia, and on the 24th routed Gen. Crook near Winchester, inflicting a loss of 1,200. He then sent a body of cavalry on a raid into Pennsylvania, which burned Chambersburg, July 30. On Aug. 7 Gen. Sheridan was placed in command of the federal forces to operate in the Shenandoah valley. His force was soon raised to 30,000, Early opposing him with about 20,000. He defeated Early on Opequan creek near Winchester (Sept. 19), at Fisher's Hill 8 m. S. (Sept. 22), and on Cedar creek near by (Oct. 19), virtually clearing the valley of confederate troops. In the battle of Opequan creek he lost 3,000 men, and captured the same number of prisoners and 5 guns; in that of Fisher's Hill he took 1,100 prisoners and 16 guns. In the battle of Cedar creek Early surprised the Union camp at dawn in the absence of Gen. Sheridan, driving back the troops in confusion and capturing the camp and defences, 24 guns, and 1,200 prisoners. Sheridan, then at Winchester, being aroused by the firing, hurried to the front, and having reorganized his troops, retook the camp and guns in the afternoon, recovering many of the prisoners taken in the morning, and taking from the enemy 1,500 prisoners, 23 guns, and 1,500 small arms, besides equipments.—When Gen. Grant assumed the chief command, Gen. W. T. Sherman was placed in command of the division of the Mississippi, comprising the departments of the Ohio, the Cumberland, the Tennessee, and the Arkansas, and was to move against Atlanta, Ga., simultaneously with Grant's advance on Richmond. His forces for the campaign were encamped around Chattanooga, and consisted of a little less than 100,000 men, with about 250 guns, comprising the army of the Cumberland, Gen. Thomas; the army of the Tennessee, Gen. McPherson; and the army of the Ohio, Gen. Schofield. He was opposed by Gen. J. E. Johnston, with about 50,000 men, encamped at Dalton, Ga., organized in three corps under Hardee, Hood, and Polk. Sherman started on May 5, and gradually forced Johnston back, compelling him after much severe fighting to cross the Chattahoochee on July 10 and seek the intrenchments covering Atlanta. Here he was superseded by Hood, who made several attacks on Sherman, which were repulsed with great loss, and was compelled to abandon Atlanta on Sept. 1. (See ATLANTA, and SHERMAN, WILLIAM TECUMSEH.) Having removed the inhabitants from the city and burned everything except the dwellings and churches, Gen. Sherman started near the middle of November for the coast, with about 60,000 men. Marching through the heart of Georgia without opposition, he reached the vicinity of Savannah. On Dec. 13 Fort McAllister on the Ogeechee river, in the rear of Savannah, was carried by assault by Gen. Hazen, and communication was then opened with the fleet. On the 21st Savannah was occupied, having been abandoned by its garrison during the preceding night. Sherman left Gen. Thomas in command in Tennessee. Hood, after abandoning Atlanta, had operated for a time upon Sherman's line of communication, and then moved into N. Alabama, whence, upon learning that Sherman had started for the coast, he advanced into Tennessee with about 55,000 men, and began to move on Nashville. On Nov. 30 he was opposed at Franklin by

Gen. Schofield, who repelled repeated assaults, enabling the federal trains to cross the Harpeth river and reach Nashville. The federal loss was 189 killed, 1,033 wounded, and 1,104 missing; the confederate loss was reported by Thomas at 1,750 killed, 3,800 wounded, and 702 prisoners, while Hood admitted a total loss of 4,500. A little after midnight Schofield withdrew, and the next day reached Nashville. Hood established his lines S. of Nashville, and was attacked by Thomas on Dec. 15 and 16, and completely routed. He retreated with difficulty into Alabama, having suffered immense losses in disabled and prisoners. (See NASHVILLE.) An attempt in December, by a fleet under Admiral Porter and a land force under Gen. Butler, to reduce Fort Fisher at the mouth of Cape Fear river, commanding the approach to Wilmington, N. C., failed; but on Jan. 15, 1865, it was carried by assault under Gen. Terry, aided by the fleet. During the following night the confederate works on the opposite side of the river were abandoned and blown up. The federal forces, reënforced by troops under Gen. Schofield, occupied Wilmington on Feb. 22, the confederates under Gen. Hoke retreating. On Feb. 1 Gen. Sherman started from Savannah on a northward movement through the Carolinas, and reached Columbia on the 17th. Gen. Hardee, being thus taken in the rear, evacuated Charleston, which was occupied by a detachment of Gen. Gillmore's forces on the 18th, and the same day the United States flag was raised over Fort Sumter. Sherman continuing his march reached Fayetteville, N. C., on March 12. On the 19th the left wing under Slocum encountered the confederate army under Gen. Johnston at Bentonville, repelled several assaults, and on the 21st, being reënforced, compelled it to retreat to Smithfield, covering Raleigh. Sherman then occupied Goldsboro, whence he advanced on April 10. Johnston retreated to and through Raleigh, and on April 26 surrendered his entire army, then reduced to about 31,000 men. In the mean time a cavalry force under Gen. Wilson had swept through Alabama from the north, and passed into Georgia, doing immense injury to the confederate resources. He occupied Selma on April 2, Montgomery on the 12th, and Columbus, Ga., on the 16th. At Selma he took 32 guns and 2,700 prisoners, and at Columbus 52 guns and 1,200 prisoners, and in both places destroyed numerous factories and a vast amount of stores. Toward the end of March operations were begun for the reduction of Mobile by Gen. Canby, with a force from New Orleans aided by a fleet under Admiral Thatcher. Spanish Fort and Blakely, commanding the city from the east, were taken on April 9, and Mobile was occupied on the 12th, Gen. Maury with 9,000 men fleeing up the Alabama river. (See MOBILE.) On May 4 Gen. Taylor surrendered the confederate forces in Alabama to Gen. Canby. The last fight of the war occurred, May 13, on the Rio Grande in Texas, between Col. Barrett (federal) and Gen. Slaughter (confederate), the latter being victorious. The trans-Mississippi army of the confederates, the last in the field, was surrendered by Kirby Smith on May 26. Measures were immediately taken to disband the federal armies, and in a few months the greater part of the soldiers had returned to civil life.—The strength of the national armies at different periods was as follows: July 1, 1861, 186,751; Jan. 1, 1862, 575,917; Jan. 1, 1863, 918,191; Jan. 1, 1864, 860,737; Jan. 1, 1865, 959,460; May 1, 1865, 1,000,516. At the last date the number of men enrolled as subject to military duty, but not called out, was 2,254,063. The whole number of men called for by the government was 2,759,049; number furnished, 2,666,999 (equivalent to 2,135,000 for three years), of whom 186,097 were colored. This does not correctly represent the number of different persons under arms, as it includes reënlistments. A considerable number of men called out for short periods upon emergencies are not included. The total includes some who enlisted in the navy. Only a small number were obtained by the drafts, the result being as follows: held to personal service, 46,347; furnished substitutes, 73,607; paid commutation, 86,724; total, 206,678, to which should be added 87,588 credited to the states under the draft of 1862. The amount of commutation money received by the government was $26,366,316 78. The number of men who received the United States bounty ($100 to $400 each) was 1,722,690; amount paid, $300,223,500. The amount of bounties paid by states and local authorities, so far as returned, was $285,941,036. The casualties in the army numbered 280,739, viz.: 5,221 officers and 90,868 men killed in action or died of wounds, and 2,321 officers and 182,329 men died from disease or accident. These numbers do not include deaths after leaving the army from wounds or disease contracted in the service. The above statistics are compiled from the report of the provost marshal general ("Message and Documents, War Department, 1865–'6").—During the war confederate cruisers, mostly built and fitted out in British ports, scoured the ocean. Evading vessels of war, they destroyed hundreds of merchantmen, doing irreparable injury to the commerce of the Union. The chief of these were the Alabama, Chickamauga, Florida, Georgia, Olustee, Shenandoah, Sumter, and Tallahassee. The Alabama, the most famous, commanded by Raphael Semmes, was sunk off Cherbourg, France, June 19, 1864, by the United States steamer Kearsarge, commanded by Capt. Winslow. A presidential proclamation of June 23, 1865, removed the blockade of all the ports in the southern states, and another of Aug. 29 annulled all restrictions upon trade with them. On April 2, 1866, the insurrection was proclaimed at an end in all the states except Texas, and there on Aug. 20. After the fall of Richmond President Davis of the confederacy fled south, and was captured at Irwinville, Ga., by Gen. Wilson's forces, May 10, 1865. He and some other prominent leaders were imprisoned for a time, but no man was punished for participation in the rebellion. On May 29, 1865, the president issued an amnesty proclamation, excepting 14 classes of those most prominent in the rebellion. This was followed by others on Sept. 7, 1867, July 4, 1868, and Dec. 25, 1868, the last making the amnesty universal.—A peculiar feature of the war was the voluntary organizations of citizens to promote the moral and physical welfare of the soldiers. The chief of these were the United States sanitary commission, the United States Christian commission, and the Western sanitary commission, organized in 1861. The sanitary commissions were designed to coöperate with the medical bureau of the war department, and performed valuable services in the prevention of disease, in supplying food, clothing, and hospital stores, in the relief of prisoners, and in other ways. They had branches throughout the north, and received large contributions in money and supplies. The Christian commission was composed of representatives of the young men's Christian associations, and performed services similar to those of the sanitary commissions, together with others of a more strictly religious character. Toward and after the close of the war various societies were organized for the relief of Union refugees from the south, the care of the freedmen, and the restoration of industry and education in the region devastated by war. By the act of March 3, 1865, the bureau of refugees, freedmen, and abandoned lands was created in the war department. (See FREEDMEN.)—The question of emancipation early attracted the attention of the president and congress. On April 16, 1862, an act was passed abolishing slavery in the District of Columbia, and on June 9 another act declared that slavery should not thereafter exist in the territories. The act of July 17 declared that all slaves of persons who should thereafter be engaged in rebellion, escaping and taking refuge within the lines of the army, all slaves of such persons captured, or deserted and coming under the control of the United States, and all slaves of such persons found in any place occupied by rebel forces and afterward occupied by the federal forces, should be free. The same act authorized the president to receive into the military and naval service persons of African descent. On Jan. 1, 1863, the president issued a proclamation, in pursuance of a warning contained in a proclamation of Sept. 22, 1862, declaring free all persons held as slaves within the states or portions of states then in rebellion. (See SLAVERY.) On April 8, 1864, a joint resolution amending the federal constitution, by declaring that slavery shall not exist within the United States or any place subject to their control, passed the senate by a vote of 38 to 6, and on Jan. 31, 1865, it was approved by the house of representatives by a vote of 119 to 56. This, known as the thirteenth amendment, the secretary of state on Dec. 18, 1865, proclaimed ratified by the legislatures of three fourths of the states, and consequently valid to all intents and purposes as a part of the constitution. The first step toward the reconstruction of loyal governments in the seceded states was the proclamation of President Lincoln of Dec. 8, 1863. This promised full pardon, with restoration of rights of property, except as to slaves, to all persons (with some exceptions) who had participated in the rebellion, upon condition that they should take and maintain an oath to support and defend the constitution of the United States and the union of the states thereunder, and to abide by all acts of congress and proclamations of the president having reference to slaves. It also provided that when in any of the seceded states persons, not less in number than one tenth of the votes cast at the presidential election of 1860 in that state, who had taken and not violated the oath and were qualified voters by law of the state in force immediately before secession, should reëstablish a republican government in no wise contravening the oath, such government should be recognized as the true government of the state. Under this scheme governments were organized in Louisiana and Arkansas in the early part of 1864, and in Tennessee early in 1865, but senators and representatives from those states were not admitted to congress. After the close of the war President Johnson recognized these governments, and also recognized Francis H. Pierpont as governor of Virginia, who after the admission of West Virginia had exercised jurisdiction in a few counties adjacent to Washington. On May 29, 1865, President Johnson appointed a provisional governor of North Carolina, and in June and July similar officers were appointed for Mississippi, Georgia, Texas, Alabama, South Carolina, and Florida. It was made the duty of the provisional governor in each state to call a convention, the delegates to which were to be elected by those who were qualified voters by the laws in force in the respective states immediately previous to secession, and who had taken the oath prescribed by the amnesty proclamation of the same date, similar to that of Lincoln's, for the purpose of restoring these states to their constitutional relations to the federal government. Conventions were accordingly held during the year in all these states except Texas, where a convention met in 1866. Ordinances were passed abolishing slavery, declaring the debt incurred in aid of the confederacy void, and repealing the ordinances of secession. State officers and congressmen were elected, and the legislatures ratified the thirteenth amendment. But congress did not approve this scheme of reconstruction, and senators and representatives from those states were not admitted.

On April 9, 1866, the "civil rights bill" was passed by congress over the president's veto; it enacted "that all persons born in the United States and not subject to any foreign power, excluding Indians not taxed, are hereby declared to be citizens of the United States; and such citizens of every race and color, without regard to any previous condition of slavery or involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall have the same right in every state and territory in the United States to make and enforce contracts; to sue, be parties, and give evidence; to inherit, purchase, lease, sell, hold, and convey real estate and personal property; and to full and equal benefit of all laws and proceedings for the security of person and property, as is enjoyed by white citizens, and shall be subject to like punishment, pains, and penalties, and to none other; any law, statute, ordinance, regulation, or custom to the contrary notwithstanding." The United States courts were given jurisdiction of offences against this act. On June 8 a joint resolution passed the senate by a vote of 33 to 11, and on the 13th was approved by the house by a vote of 138 to 36, proposing an amendment to the constitution, which is known as the fourteenth amendment. It provides that "all persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the state wherein they reside," and that "no state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States;" that when the right of suffrage in any state "is denied to any of the male inhabitants of such state, being 21 years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens 21 years of age in such state;" that "the validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned;" and that "neither the United States, nor any state, shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave." It also incapacitates from holding office certain classes of persons who shall have engaged in insurrection or rebellion against the United States, or given aid or comfort to the enemies thereof; but congress may by a vote of two thirds of each house remove such disability. Under this power the disabilities have been removed from great numbers by special acts, and by the act of May 22, 1872, from all "except senators and representatives of the 36th and 37th congresses, officers in the judicial, military, and naval service of the United States, heads of departments, and foreign ministers of the United States," who joined the confederate cause. In July, 1866, senators and representatives were admitted from Tennessee, that state having ratified the fourteenth amendment. On Jan. 8, 1867, an act was passed over President Johnson's veto conferring the right of suffrage on colored citizens of the District of Columbia, and on the 24th a similar act became a law for the territories. The congressional plan of reconstruction was developed in the act of March 2 and the supplementary acts of March 23 and July 19, each of which was passed over the president's veto. These acts declared that "no legal state governments or adequate protection for life or property now exist in the rebel states of Virginia, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Florida, Texas, and Arkansas," and divided them into five military districts. It was made the duty of the president to assign to the command of each of these districts an officer of the army not below the rank of brigadier general, and to detail a sufficient military force to enable each officer to enforce his authority. The district commanders were required to make a registration of voters, comprising male citizens of the United States 21 years old and upward, without regard to race, color, or previous condition, who had resided in the respective states one year and were not excluded from holding office by the fourteenth amendment. Upon registration voters were required to take and subscribe an oath, declaring among other things that they had not been disfranchised for participation in any rebellion or civil war against the United States; that they had never been members of any state legislature, nor held any executive or judicial office in any state, nor taken an oath in an official capacity to support the constitution of the United States, and afterward engaged in insurrection or rebellion against the United States, or given aid or comfort to the enemies thereof; and engaging faithfully to support the constitution and obey the laws of the United States, and to encourage others to do so. Delegates were to be elected in the several states by the registered voters to conventions for framing new constitutions. Only when constitutions had been adopted conferring the right of suffrage on colored persons, and such constitutions had been approved by congress, and when the fourteenth amendment had been ratified by the legislatures of the respective states, were senators and representatives to be admitted. The conditions of these acts were complied with in Alabama, Arkansas, Florida, Georgia, Louisiana, North Carolina, and South Carolina in 1868, and in Mississippi, Texas, and Virginia in 1870. But in Georgia the subsequent action of the legislature in excluding colored members led to further measures on the part of congress, and delayed the final restoration of that state until 1870. The adoption of the fourteenth amendment was proclaimed on July 28, 1868. On Feb. 25, 1869, a joint resolution proposing an amendment to the constitution, known as the fifteenth amendment, passed the house of representatives by a vote of 144 to 44, and on the following day was approved by the senate by a vote of 39 to 13. Its adoption was proclaimed on March 30, 1870. The amendment is as follows: "The right of citizens of the United States to vote shall not be denied or abridged by the United States, or by any state, on account of race, color, or previous condition of servitude." —The second election of Lincoln had taken place before the close of the war, and just previous to the election Nevada had been admitted into the Union. The national republican convention assembled at Baltimore on June 7, 1864, and nominated President Lincoln for reelection, and for vice president Andrew Johnson of Tennessee. The platform adopted contained the following resolutions: "That it is the highest duty of every American citizen to maintain against all their enemies the integrity of the Union, and the paramount authority of the constitution and laws of the United States; and that, laying aside all differences of political opinion, we pledge ourselves as Union men, animated by a common sentiment, and aiming at a common object, to do everything in our power to aid the government in quelling by force of arms the rebellion now raging against its authority, and in bringing to the punishment due to their crimes the rebels and traitors arrayed against it. That, as slavery was the cause, and now constitutes the strength of the rebellion, and as it must be, always and everywhere, hostile to the principles of republican government, justice and the national safety demand its utter and complete extirpation from the soil of the republic; and that, while we uphold and maintain the acts and proclamations by which the government in its own defence has aimed a death blow at this gigantic evil, we are in favor furthermore of such an amendment to the constitution, to be made by the people in conformity with its provisions, as shall terminate and for ever prohibit the existence of slavery within the limits or the jurisdiction of the United States." The national democratic convention assembled at Chicago on Aug. 29, and nominated Gen. George B. McClellan for president, and for vice president George H. Pendleton of Ohio. The platform declared adherence to the Union under the constitution, and contained the following resolution: "That this convention does explicitly declare, as the sense of the American people, that after four years of failure to restore the Union by the experiment of war, during which, under the pretence of a military necessity, or war power higher than the constitution, the constitution itself has been disregarded in every part, and public liberty and private right alike trodden down and the material prosperity of the country essentially impaired, justice, humanity, liberty, and the public welfare demand that immediate efforts be made for a cessation of hostilities, with a view to an ultimate convention of the states, or other peaceable means, to the end that at the earliest practicable moment peace may be restored on the basis of the federal union of the states." The election took place on Nov. 8, the eleven seceded states not participating. McClellan and Pendleton received the electoral votes of New Jersey, Delaware, and Kentucky, 21; Lincoln and Johnson received those of all the other states, 212, and were elected. The popular vote was 2,213,665 for Lincoln, and 1,802,237 for McClellan. On March 4, 1865, Lincoln's second inauguration took place. On April 14 he was assassinated (see LINCOLN, ABRAHAM), and on the following day Vice President Johnson entered upon the duties of the presidency. In July, 1866, Postmaster General Dennison, Attorney General Speed, and Secretary of the Interior Harlan resigned, and were succeeded by Alexander W. Randall of Wisconsin, Henry Stanbery of Ohio, and Orville H. Browning of Illinois. The difference between the president and congress on the question of reconstruction led to his separation from the republican party, and to the passage on March 2, 1867, over his veto, of the "tenure of office" act, which took from the president the power to remove without the consent of the senate such civil officers as are appointed by the president with the consent of the senate. In August, 1867, Gen. Grant was appointed secretary of war *ad interim* in place of Mr. Stanton, suspended. When congress assembled in December, the president sent to the senate his reasons for the suspension, which that body did not approve; and thereupon in January, 1868, Gen. Grant surrendered the office to Mr. Stanton. On Feb. 21 the president issued an order removing Mr. Stanton from office and designating Gen. Lorenzo Thomas secretary of war *ad interim;* but as the senate had passed a resolution that the president did not possess the power of removal, Mr. Stanton refused to surrender the office. On the 24th a resolution for the impeachment of President Johnson was adopted by the house of representatives, and articles were subsequently drawn up charging him with high misdemeanors in office in the removal of Stanton and appointment of Thomas, and in attempting to bring congress into contempt and reproach. He was tried before the senate and acquitted in May, there being a majority against him, but not the necessary two-thirds vote. (See JOHNSON, ANDREW.) Secretary Stanton thereupon resigned, and was succeeded by Gen. John M. Schofield. In July Mr. Stanbery was succeeded by William M. Evarts of New York as attorney general. One new state, Nebraska, was admitted during Mr. Johnson's administration, in February, 1867; and in the same year Alaska was purchased of Russia. On Feb.

22, 1868, a naturalization treaty was concluded with the North German confederation. The national republican convention assembled at Chicago on May 21, 1868, and nominated Gen. Ulysses S. Grant for president, and for vice president Schuyler Colfax of Indiana. The platform congratulated the country on the success of the reconstruction policy of congress; denounced all forms of repudiation as a national crime; declared that "the national honor requires the payment of the public indebtedness in the uttermost good faith to all creditors at home and abroad, not only according to the letter, but the spirit of the laws under which it was contracted;" and that "the guaranty by congress of equal suffrage to all loyal men at the south was demanded by every consideration of public safety, of gratitude, and of justice, and must be maintained; while the question of suffrage in all the loyal states properly belongs to the people of those states." The national democratic convention assembled at New York on July 4, and nominated Horatio Seymour of New York for president and Francis P. Blair, jr., of Missouri, for vice president. The platform recognized the settlement of the questions of slavery and secession by the war or the voluntary action of the southern states; demanded the "immediate restoration of all the states to their rights in the Union under the constitution," "amnesty for all political offences and the regulation of the elective franchise in the states by their citizens," and "the abolition of the freedmen's bureau and all political instrumentalities designed to secure negro supremacy;" denounced the reconstruction acts of congress "as usurpations and unconstitutional, revolutionary, and void;" arraigned the republican party because, "instead of restoring the Union, it has, so far as in its power, dissolved it, and subjected ten states, in time of profound peace, to military despotism and negro supremacy;" and declared that "where the obligations of the government do not expressly state upon their face, or the law under which they were issued does not provide, that they shall be paid in coin, they ought, in right and in justice, to be paid in the lawful money of the United States." The election took place on Nov. 3, Virginia, Mississippi, and Texas not voting. Seymour and Blair received the electoral votes of New York, New Jersey, Delaware, Maryland, Georgia, Louisiana, Kentucky, and Oregon, 80; Grant and Colfax received those of all the other states, 214, and were elected. The total popular vote was 5,716,788, of which 3,013,188 were for the Grant electors and 2,703,600 for the Seymour electors. This was the first presidential election in which any considerable number of colored voters participated. (See GRANT, ULYSSES S.) In 1872 President Grant was reëlected. On May 1 of that year a convention assembled at Cincinnati, composed of persons previously in sympathy with the republican party, but now dissatisfied with the administration of President Grant and opposed to his reëlection. They styled themselves "liberal republicans." By this convention Horace Greeley of New York was nominated for president, and Benjamin Gratz Brown of Missouri for vice president. The platform opposed any reopening of the questions settled by the thirteenth, fourteenth, and fifteenth amendments of the constitution, and the candidacy of any president for reëlection; demanded the immediate and absolute removal of all disabilities imposed on account of the rebellion, a thorough reform of the civil service as one of the most pressing necessities of the hour, and a speedy return to specie payments; denounced repudiation in every form and guise; and declared that "local self-government, with impartial suffrage, will guard the rights of all citizens more securely than any centralized power." The national republican convention assembled at Philadelphia on June 5, and nominated President Grant for reëlection, and for vice president Henry Wilson of Massachusetts. The platform, appealing to the history of the party, recited that it had suppressed a gigantic rebellion, emancipated 4,000,000 slaves, decreed the equal citizenship of all, established universal suffrage, and, with unparalleled magnanimity, had punished no man for political offences; approved the action of congress in extending amnesty to those lately in rebellion; favored reform in the civil service; denounced repudiation of the public debt, in any form or disguise, as a national crime; announced a confident expectation of a speedy resumption of specie payment; declared that "the recent amendments to the national constitution should be cordially sustained because they are right, not merely tolerated because they are law, and should be carried out according to their spirit by appropriate legislation, the enforcement of which can safely be intrusted only to the party that secured those amendments;" that "neither the law nor its administration should admit any discrimination in respect of citizens by reason of race, creed, color, or previous condition of servitude;" and that "congress and the president have only fulfilled an imperative duty in their measures for the suppression of violent and treasonable organizations in certain lately rebellious regions, and for the protection of the ballot box." The national democratic convention assembled at Baltimore on July 9, and nominated the same candidates and adopted the same platform as the Cincinnati convention. On Sept. 3 a convention of "straight-out" democrats, opposed to the Baltimore nominations and platform, assembled at Louisville, Ky., and nominated Charles O'Conor of New York for president and John Quincy Adams of Massachusetts for vice president. Conventions were also held and nominations made by the "labor reform" and "temperance" parties. The candidates of the former declined, and no ticket was put in the field; the candidates of the latter were, for president James

Black of Pennsylvania, for vice president John Russell of Michigan. The election, which took place on Nov. 5, resulted in the choice of Grant and Wilson, who each received 286 electoral votes. Greeley having died prior to the choice of president by the electors, the 66 votes of the opposition were given to various persons. Grant and Wilson received a majority of the popular vote in all the states except Georgia, Kentucky, Maryland, Missouri, Tennessee, and Texas, which voted for Greeley and Brown, and Louisiana, where the result was in dispute, two returns being made, one in favor of either party, both claimed to be legal and correct. No electoral votes were counted from Louisiana, nor from Arkansas (owing to certain irregularities), those states together being entitled to 14 votes. The popular vote, excluding Louisiana, which cast about 125,000 votes, was 6,337,662, of which 3,525,469 were for Grant, 2,777,096 for Greeley, 29,489 for O'Conor, and 5,608 for Black. The inauguration took place on March 4, 1873, and the cabinet was constituted as follows, the only change being in the secretary of the treasury: Hamilton Fish, secretary of state; William M. Richardson of Massachusetts, of the treasury; William W. Belknap, of war; George M. Robeson, of the navy; Columbus Delano, of the interior; George H. Williams, attorney general; and John A. J. Creswell, postmaster general. In 1874 Mr. Richardson was succeeded by Benjamin H. Bristow of Kentucky, and Mr. Creswell by Marshall Jewell of Connecticut; in 1875 Mr. Delano was succeeded by Zachariah Chandler of Michigan and Mr. Williams by Edwards Pierrepont of New York; and in 1876 Mr. Belknap was succeeded by Alphonso Taft of Ohio. In 1869 the Central and Union Pacific railroads were completed, opening a highway between the Atlantic and Pacific coasts. One of the most prominent events of Grant's administration is the settlement of outstanding disputes with Great Britain, of which the principal related to the charge that the British government had failed in its duties as a neutral in allowing the construction and fitting out of confederate cruisers in British ports. The claims for damages on this account are known as the "Alabama claims." After protracted correspondence it was agreed to appoint a joint high commission to negotiate a treaty. The commissioners on the part of the United States were Hamilton Fish, secretary of state; Samuel Nelson, associate justice of the supreme court; Robert C. Schenck, then minister to England; E. R. Hoar, late attorney general; and George H. Williams, then United States senator. Those on the part of Great Britain were Earl de Grey (now marquis of Ripon), Baron Grantham, Sir Stafford Henry Northcote, Sir Edward Thornton, Sir John Alexander Macdonald, and Montague Bernard. The commissioners assembled in Washington, Feb. 27, 1871, and on May 8 signed the treaty of Washington, the ratifications of which were exchanged at London on June 17. The treaty provided for the settlement of the Alabama claims by a tribunal of arbitration to meet at Geneva, Switzerland, and to be composed of five arbitrators, appointed one each by the president, the queen, the king of Italy, the president of the Swiss confederation, and the emperor of Brazil. Other claims of American citizens against the British government and of British subjects against the United States arising out of acts committed between April 13, 1861, and April 9, 1865, were to be referred to three commissioners, appointed, one by the president, one by the queen, and one by the two jointly, to meet in Washington. The conflicting claims of the two nations, growing out of the treaty of June 15, 1846, to San Juan and other islands between Washington territory and Vancouver island, were referred to the arbitration of the emperor of Germany. The treaty also contained certain stipulations respecting the navigation of rivers, lakes, and canals adjacent to the United States and Canada, and respecting the transit of goods through those countries, and provisions respecting the coast fisheries. (See FISHERIES, vol. vii., p. 231.) Three commissioners, to sit at Halifax, Nova Scotia, and to be appointed, one by the president, one by the queen, and one by the two jointly, were provided for the determination of the claim of Great Britain to compensation for the rights of fishery granted by her. The Geneva tribunal was composed of the following arbitrators: Charles Francis Adams, appointed by the United States; Sir Alexander J. E. Cockburn, by Great Britain; Count Paolo Federigo Sclopis de Salerano, by Italy; Jakob Staempfli, by Switzerland; and Marcos Antonio d'Araujo, baron (afterward viscount) d'Itajubá, by Brazil. The tribunal convened on Dec. 15, 1871, the United States being represented by J. C. Bancroft Davis as agent, and Caleb Cushing, William M. Evarts, and Morrison R. Waite as counsel. On Sept. 14, 1872, a decision was rendered that Great Britain had failed in her duties as a neutral in the cases of the Alabama, Florida, Shenandoah, and their tenders, and awarded to the United States the sum of $15,500,000 in gold. This sum was promptly paid by Great Britain, and a commission, appointed under an act of congress, is now (1876) in session in Washington determining the rights of individual claimants. The San Juan question was decided in favor of the United States by the German emperor on Oct. 21, 1872. (See SAN JUAN.) (See "Papers relating to the Treaty of Washington," published by the department of state, 5 vols., 1872.) The Washington commission was composed of James S. Frazer, appointed by the United States; Russell Gurney, by Great Britain; and Count Corti, Italian minister at Washington, by the two jointly. It assembled Sept. 26, 1871, and adjourned Sept. 25, 1873, after making an award against the United States of $1,929,819. The Halifax commission has not yet (1876) been organized. For a notice of the negotiations respecting the annexation of Santo Domingo (1869–'71), see Grant, Ulysses S., vol. viii., p. 160. Since the outbreak of the Cuban rebellion, the relations between Spain and the United States have frequently been disturbed. The capture of the steamer Virginius on the high seas under the United States flag on Oct. 31, 1873, by the Spanish man-of-war Tornado, for a time threatened war. The Virginius was taken to a Cuban port, and several of those on board were summarily shot on the charge of being connected with the insurrection. On Dec. 16 the steamer was given up to the United States, and two days after the survivors of those on board were surrendered. In the spring of 1875 Spain paid the United States $80,000 for the relief of the families of those executed. In 1868 a secret organization, known as the Ku-Klux Klan, made its appearance in the south, and numerous outrages were committed by its members on colored citizens and others who favored the congressional plan of reconstruction. On April 20, 1871, congress passed an act to enforce the provisions of the fourteenth amendment, by which cognizance of these offences was given to the United States courts, and several convictions were had under its provisions. On May 31, 1870, an act had been passed (amended Feb. 28, 1871) to enforce the provisions of the fifteenth amendment, the design of which was to protect colored citizens in their right to vote. An act of March 1, 1875, prohibited the denial of equal rights in inns, public conveyances, theatres, &c., to any one on account of race, color, or previous condition of servitude. (See Census, vol. iv., p. 797.)—The following is a list of the presidents and vice presidents, to the date of this volume:

PRESIDENTS.	States of which citizens.	Terms.
George Washington	Virginia	April 30, 1789, to March 4, 1797.
John Adams	Massachusetts	March 4, 1797, to March 4, 1801.
Thomas Jefferson	Virginia	March 4, 1801, to March 4, 1809.
James Madison	Virginia	March 4, 1809, to March 4, 1817.
James Monroe	Virginia	March 4, 1817, to March 4, 1825.
John Quincy Adams	Massachusetts	March 4, 1825, to March 4, 1829.
Andrew Jackson	Tennessee	March 4, 1829, to March 4, 1837.
Martin Van Buren	New York	March 4, 1837, to March 4, 1841.
William Henry Harrison*	Ohio	March 4, 1841, to April 4, 1841.
John Tyler	Virginia	April 4, 1841, to March 4, 1845.
James Knox Polk	Tennessee	March 4, 1845, to March 4, 1849.
Zachary Taylor*	Louisiana	March 4, 1849, to July 9, 1850.
Millard Fillmore	New York	July 9, 1850, to March 4, 1853.
Franklin Pierce	New Hampshire	March 4, 1853, to March 4, 1857.
James Buchanan	Pennsylvania	March 4, 1857, to March 4, 1861.
Abraham Lincoln*	Illinois	March 4, 1861, to April 15, 1865.
Andrew Johnson	Tennessee	April 15, 1865, to March 4, 1869.
Ulysses S. Grant	Illinois	March 4, 1869, to March 4, 1877.
Rutherford Birchard Hayes	Ohio	March 5, 1877, to March 4, 1881.
James Abram Garfield*	Ohio	March 4, 1881, to Sept. 19, 1881.
Chester Alan Arthur	New York	Sept. 19, 1881, to March 4, 1885.
VICE PRESIDENTS.		
John Adams	Massachusetts	April 21, 1789, to March 4, 1797.
Thomas Jefferson	Virginia	March 4, 1797, to March 4, 1801.
Aaron Burr	New York	March 4, 1801, to March 4, 1805.
George Clinton*	New York	March 4, 1805, to April 20, 1812.
Elbridge Gerry*	Massachusetts	March 4, 1813, to Nov. 23, 1814.
Daniel D. Tompkins	New York	March 4, 1817, to March 4, 1825.
John Caldwell Calhoun†	South Carolina	March 4, 1825, to Dec. 28, 1832.
Martin Van Buren	New York	March 4, 1833, to March 4, 1837.
Richard Mentor Johnson	Kentucky	March 4, 1837, to March 4, 1841.
John Tyler	Virginia	March 4, 1841, to April 4, 1841.
George Mifflin Dallas	Pennsylvania	March 4, 1845, to March 4, 1849.
Millard Fillmore	New York	March 4, 1849, to July 9, 1850.
William Rufus King*	Alabama	March 4, 1853, to April 18, 1853.
John Cabell Breckinridge	Kentucky	March 4, 1857, to March 4, 1861.
Hannibal Hamlin	Maine	March 4, 1861, to March 4, 1865.
Andrew Johnson	Tennessee	March 4, 1865, to April 15, 1865.
Schuyler Colfax	Indiana	March 4, 1869, to March 4, 1873.
Henry Wilson*	Massachusetts	March 4, 1873, to Nov. 22, 1875.
William Almon Wheeler	New York	March 5, 1877, to March 4, 1881.
Chester Alan Arthur	New York	March 4, 1881, to Sept. 19, 1881.

The chief justices have been as follows: John Jay of New York, Sept. 26, 1789, to June 29, 1795; John Rutledge of South Carolina, July 1, 1795, to Dec. 15, 1795 (appointed in the recess of the senate, presided at the August term, rejected by the senate); Oliver Ellsworth of Connecticut, March 4, 1796, to October. 1800; John Marshall of Virginia, Jan. 31, 1801, to July 6, 1835; Roger Brooke Taney of Maryland, March 15, 1836, to Oct. 12, 1864; Salmon Portland Chase of Ohio, Dec. 6, 1864, to May 7, 1873; and Morrison Remich Waite of Ohio, appointed Jan. 21, 1874. William Cushing of Massachusetts, appointed Jan. 27, 1796, and John Jay, reappointed Dec. 19, 1800, declined.

UNITED STATES, Literature of the. The literary history of the United States may be treated under three distinctly marked periods, viz., a colonial or ante-revolutionary period (1620–1775), during which the literature of the country was closely assimilated in form and character to that of England; a first American period (1775–1820), which witnessed the transition from a style for the most part imitative to one in some degree national; and a second American (from 1820 to the present time), in which the literature of the country assumed a decided character of originality. I. 1620–1775. The first literary production of any note in the British American colonies was the version of Ovid's "Metamorphoses" made by George Sandys in Virginia about 1620 (London, 1626). But though men of letters were found everywhere among the early colonists, in New England alone, where in 1639 the first printing press was established in Cambridge, was any considerable progress in literary culture made, and the literature of the first or colonial period was chiefly confined to that locality or was indirectly connected with it. The earliest development was theological. The "Bay Psalm Book" (Cambridge, 1640), the first book printed in the country, though not strictly original, became very popular both in America and Great Britain, and within a little more than a century passed through 70 editions. Ten years later a volume of poems by Mrs. Anne Bradstreet of Massachusetts (1612–'72), entitled "The Tenth Muse lately sprung up in America," was published in London, and reprinted in Boston with additions in 1678. "The simple Cobler of Agawam," a quaint satire by Nathaniel Ward, pastor of the church at Ipswich, Mass., was written there in 1645 and published in London in 1647, after the author's return to England. The most remarkable early productions of the colonial press were the Indian Bible of John Eliot (1604–'90), the first edition of the Scriptures published in America (Cambridge, 1661–'3), and an extraordinary monument of patience and industry, though now of interest only to the antiquary; the "Concordance of the Scriptures," by John Newman, which was the earliest work of its kind, and the immediate precursor of Cruden's Concordance; and the prolific writings of Increase and Cotton Mather, the latter of whom (1663–1728) was the author of 382 works, of most of which not even the titles are remembered; the most celebrated are the "Wonders of the Invisible World" and the *Magnalia Christi Americana*, an ecclesiastical history of New England from 1620 to 1698, containing biographies of several colonial worthies. To the early colonial times also belong John Cotton (1585–1652), one of the first ministers of Boston; Thomas Hooker (1586–1647); Roger Williams (1606–'83), the founder of Rhode Island; John Davenport (1598–1670), Charles Chauncy (1592–1672), and John Norton (1606–'63), eminent in their day as theological writers, but whose works are now little known. The establishment of Harvard college in 1636, and of William and Mary and Yale colleges in the last decade of the 17th century, and the practice which became common with many of the wealthier colonists of sending their sons to England to be educated, showed their effects in the gradual improvement of style and in the more discursive aims of writers. A Virginia gentleman, Col. William Byrd (1674–1744), wrote an interesting narrative of a journey made in 1728 and other sketches of travel in Virginia, published as "The Westover Manuscripts" in 1841. But theology was still the department of letters most generally cultivated, and among theologians Jonathan Edwards (1703–'58), whose power of subtle argument Sir James Mackintosh declares to be "perhaps unmatched, certainly unsurpassed among men," was the first not only in America, but, according to Robert Hall, in "any country or age." His celebrated treatise on the "Freedom of the Will" ranks among the standard authorities in English metaphysics; and his other works exhibit a force of thought and keenness of argument only displayed by the greatest minds. Other theologians of the colonial period were a second Charles Chauncy (1705–'87); James Blair (1656–1743), president of William and Mary college; Jonathan Mayhew (1720–'66), a vigorous opponent of episcopacy and a man of liberal political views; Samuel Johnson (1696–1772), the first president of Columbia college, and the father of the American Episcopal church; John Witherspoon (1722–'94); and Ezra Stiles (1727–'95), president of Yale college. John Woolman (1720–'72), a Quaker writer and preacher, deserves mention as one of the first who wrote against slavery. The influence of the great English essayists and novelists of the 18th century had meanwhile begun to affect the literature of the new world; and in the essays, the collection of maxims published under the title of "Poor Richard," the scientific papers, and the autobiography of Benjamin Franklin (1706–'90), we have specimens of practical philosophy or of simple narrative, expressed in a style eminently clear, pleasing, and condensed, and not unfrequently embellished by the wit and elegance characteristic of the best writers of Queen Anne's time. His investigations in electricity and other scientific subjects are not less felicitously narrated, and, together with the works of James Logan (1674–1751), Paul Dudley (1675–1751), Cadwallader Colden (1688–1776), and John Bartram, a naturalist and one of the earliest of American travellers (1701–'77), constitute the chief contributions to scientific literature during the colonial period. The historians and annalists are less prominent than the theologians; but the tracts and pamphlets relating to the discovery and colonization of British America, written by early settlers, are exceedingly numerous, and the journals and annals of Winthrop, Winslow, Morton, and others are worthy of note as being the sources from which modern historical writers have derived much important information. William Hubbard (1621–1704) wrote a history of New England, which was not published until more than a century after his death; and Thomas Prince (1687–1758) began a more extensive work on the same subject, which was never completed. Among the earlier contributions to American local history are the "History of the Present State of Virginia," by Robert Beverley (London, 1705), that of the discovery and settlement of Virginia by William Stith (died 1750), and that of Massachusetts by Thomas Hutchinson, its last colonial governor, a man of considerable learning and culture. Of works relating to the Indians, the most noteworthy were the history of King Philip's war by the famous Capt. Benjamin Church (1639–1718), the history of the Five Nations by Cadwallader Colden, and the "Diary" of the missionary David Brainerd (1718–'47). The poetry of this period has no pretension to literary merit, but the drama of "The Prince of Parthia," by Thomas Godfrey, a son of the inventor of the mariners' quadrant, deserves mention as the first work of the class produced in America. II. 1775–1820. The earliest works produced during the first American period, beginning with the revolution, are naturally associated with the causes which led to that event; and the political pamphlets, speeches, letters, and other writings of the men who aided in securing the independence of the North American colonies afford the first indications of a desire to cast aside the conventionalisms of European literature, and to develop one characteristic of the country and its institutions. The severance of the intellectual reliance of the colonies upon the mother country followed as a consequence of their political independence, and as early as the commencement of the revolutionary struggle the high literary ability and practical wisdom evinced in the public documents of the principal American statesmen were recognized by Lord Chatham, who praised them as rivalling the masterpieces of antiquity. Politics now gained a prominence almost equal to that enjoyed by theology in the preceding period; and dry as such subjects usually are to the mass of readers, the discussion of them in speeches and pamphlets during the last quarter of the 18th century accorded thoroughly with the popular taste, and the influence of political writers and orators in giving a decided national type to American literature is unmistakable. Conspicuous among the early pamphleteers were James Otis (1725–'83), Josiah Quincy, jr. (1744–'75), John Dickinson (1732–1808), Joseph Galloway, a tory writer (1730–1803), Richard Henry Lee (1732–'94), Arthur Lee (1740–'92), William Livingston (1723–'90), William Henry Drayton (1742–'99), John Adams (1735–1826), Thomas Jefferson (1743–1826), and Timothy Pickering (1745–1829), of whom Otis and Quincy were perhaps most distinguished as orators, although little beyond the traditions of their eloquence has come down to us. For fervid declamation Patrick Henry (1736–'99) stands at the head of all the orators of this period; and in the reports of his speeches, meagre as they are, he has been more fortunate than others of his contemporaries, as Samuel Adams (1722–1803), Christopher Gadsden (1724–1805), John Rutledge (1739–1800), Edward Rutledge (1749–1800), Charles Cotesworth Pinckney (1746–1825), Gouverneur Morris (1752–1816), and George Mason (1726–'92), whose reputation as parliamentary debaters or public speakers was very high. The "Common Sense" of Thomas Paine (1737–1809), though not strictly the work of an American author, may be classed with the early national literature, from the fact that it was thoroughly American in tone, and was inspired by the causes which produced the revolution. The great state paper of this era was the "Declaration of Independence," by Thomas Jefferson, which may be considered unrivalled among works of its class. (See UNITED STATES, p. 157.) Jefferson also published a "Summary View of the Rights of British America," and "Notes on Virginia," which passed through many editions in Europe and America, and left a mass of correspondence forming a valuable contribution to American political history. The writings of George Washington (1732–'99) must always hold a distinguished place in American literature, not only for their lofty patriotism and solid common sense, but for their clearness of expression and force of language; a characteristic, indeed, of most of the writers who were contemporary with him. Alexander Hamilton (1757–1804), by turns soldier, lawyer, and statesman, was a member of the convention which framed the federal constitution; and according to Guizot there is not "one element of order, strength, or durability" in that instrument which he did not powerfully contribute to introduce. An enduring monument of his political sagacity and literary ability is the "Federalist," a series of papers written chiefly by himself for the purpose of elucidating and supporting the principles of the new constitution. Hamilton was assisted in this work by John Jay (1745–1829), the first chief justice of the United States, and James Madison (1751–1836), the fourth president, of whom the former was the author of an "Address to the People of Great Britain" issued by congress in 1774, and other political papers, and the latter a prolific writer on political, constitutional, and historical subjects. John Adams, who wrote with perspicuity and elegance, published a "Defence of the American Constitution," and a series of "Discourses on Davila," directed against the French revolutionary ideas prevalent in the last decade of the 18th century, and left numerous political papers and letters, which, together with his "Diary," begun in 1755, have been edited by his grandson Charles Francis Adams. The most accomplished rhetorician and speaker of the period was Fisher Ames (1758–1808), whose essays and orations are distinguished by a splendor of diction which often wearies the reader, notwithstanding the felicity of the metaphors and illustrations. His reputation, owing to the temporary interest of many of the subjects on which he wrote and spoke, has very much declined. —The historians and biographers of this period creditably illustrate the growing literature of the country, and several of their productions are still regarded as standard authorities. Among special local histories are those of New Hampshire by Jeremy Belknap (1744–'98), whose series of "American Biographical Sketches" were the precursors of the valuable works of Sparks; of Connecticut by Benjamin Trumbull (1735–1820); of Massachusetts by George R. Minot (1758–1802), being a continuation of that by Hutchinson; of Vermont by Samuel Williams (1761–1818); and of Pennsylvania by Robert Proud (1728–1813). Of more general interest are the histories of New England by Hannah Adams (1755–1832), and of the American revolution by William Gordon (1730–1807), an English clergyman long settled in America, and David Ramsay (1749–1815), who also wrote a history of South Carolina, a life of Washington, and other works, evincing much research and a conscientious spirit of inquiry. The "Annals of America," by Abiel Holmes (1763–1837), has for more than half a century been considered a leading authority in American history. The most important biography produced during this period is the "Life of Washington" by Chief Justice Marshall (1755–1835). William Wirt (1772–1834), an accomplished forensic orator, produced a "Life of Patrick Henry," and also a series of papers entitled "Letters of the British Spy," written with much elegance and force; and the "Military Journal" of Dr. James Thacher (1754–1844), and "Memoirs" of Alexander Graydon (1752–1818), both officers in the American revolutionary army, contain many interesting and trustworthy accounts of the men and times which they illustrate. Of works of travel, the most important are the narrative of Jonathan Carver (1732–'80); the journals of the intrepid John Ledyard (1751–'89); the reports of Major Zebulon Montgomery Pike (1779–1813), the earliest American explorer of the head waters of the Mississippi and the Rio Grande; and the account of the expedition of Lewis and Clarke across the Rocky mountains to the mouth of the Columbia river, prepared by Nicholas Biddle and Paul Allen.—The theologians of this period are ably represented by Jonathan Edwards (1745-1801), son of the great metaphysician of the same name, and the author of a profound "Dissertation on Liberty and Necessity," and of a treatise entitled "The Salvation of all Men Examined and Explained;" Samuel Hopkins (1721–1803), whose "System of Theology" presents a reflex of the progress of religious opinions in New England; Timothy Dwight (1752–1817), president of Yale college, whose principal work, "Theology Explained and Defended," maintains moderate Calvinistic views with much dignity and eloquence, and has been extensively circulated in England and America; and Bishop William White (1747–1836), the earliest historian of the Protestant Episcopal church in America. Other eminent clergymen and authors were Joseph Bellamy (1719–'90), John Smalley (1734–1820), Nathanael Emmons (1745–1840), John Mitchell Mason (1770–1829), Noah Worcester (1758–1838), Samuel Worcester (1771–1821), Edward Payson (1783–1827), Bishops John Henry Hobart (1775–1830) and Theodore Dehon (1776–1817), and John Murray (1741–1815), the father of Universalism in America. Prominent among the younger theologians was Joseph Stevens Buckminster (1784-1812), one of the earliest of the New England Unitarians, whose published sermons are remarkable for purity of thought and finish of style.—One of the first and most useful laborers in the field of science was David Rittenhouse (1732–'96), a great and self-educated genius, whose memoirs on astronomy and mathematics were published in the first four volumes of the "Transactions" of the philosophical society of Philadelphia. Benjamin Rush (1745–1813) and James McClurg (1747–1825) were conspicuous as writers on medical science, the work of the former on the "Diseases of the Mind" being still a standard authority; and Benjamin Smith Barton (1766–1815), a naturalist, produced the first American elementary work on botany, and the first contribution to the ethnographical literature of the country. The most important contribution to natural history was the "Description of the Birds of North America," by Alexander Wilson (1766–1813). Samuel Latham Mitchill (1764–1831) was one of the earliest writers on chemistry, and made valuable contributions also to zoölogy and botany. To these names may be added those of Lindley Murray (1745–1826), author of the well known "English Grammar" bearing his name, and the eminent physicist Benjamin Thompson, Count Rumford (1753–1814), both of whom were Americans by birth and education.—The most distinguished poet of this period was Philip Freneau (1752–1832), many of whose productions, inspired by the revolutionary spirit, display vigor of language and considerable imaginative power. Contemporary with him were John Trumbull (1750–1831), author of a once popular poem in the Hudibrastic style entitled "McFingal," in which the tories and other enemies to American liberty are satirized, and which presents a remarkably vivid picture of contemporary manners and opinions; Joel Barlow (1755–1812), who wrote a heavy epic entitled "The Columbiad," which was well received, and was reprinted in London and Paris, and a humorous mock-heroic poem in praise of "Hasty Pudding;" Lemuel Hopkins (1750–1801), author of a satirical poem called "The Anarchiad;" and Timothy Dwight, the theologian, whose "Conquest of Canaan" and other poems exercised considerable influence upon contemporary writers. William Clifton (1772–'99) wrote a few songs equal to any poetry which had appeared in America; and Thomas Green Fessenden (1771–1837) produced in London a very successful satire entitled "The Terrible Tractoration." Among the other poets of the period were David Humphreys (1752–1818), Joseph Hopkinson (1770–1842), author of "Hail Columbia," and Robert Treat Paine, jr. (1773–1811), whose "Adams and Liberty" was once a rallying song of the federalists. The style adopted by these writers was essentially that prevalent in England during the latter half of the 18th century; nor was any innovation upon established models, whether in form or expression, attempted in American poetry until after the commencement of the third period of the national literature.—Charles Brockden Brown (1771–1810), the first American novelist, was also the first author who made a profession of literature; his best productions, "Wieland, or the Transformation," "Arthur Mervyn," and "Edgar Huntley," have much graphic power and are good specimens of the Godwin school of fiction.—Of the miscellaneous writers of the period, whose productions appeared mostly in the newspapers and magazines, the chief were Francis Hopkinson (1737–'91), eminent as a humorous writer in prose and verse; Hugh Henry Brackenridge (1748–1816), author of a vigorous satire entitled "Modern Chivalry;" Joseph Dennie (1768–1812), one of the earliest American magazine writers and editors, who published a well known series of essays under the title of "The Lay Preacher;" David Everett (1769–1813), Isaac Story (1774–1803), Paul Allen (1775–1826), and Royall Tyler (1757–1826). Tyler was a wit, a poet, and chief justice of Vermont. His play "The Contrast," produced on the stage in New York in 1786, was the first in which the conventional Yankee dialect was used. He wrote also a successful novel called "The Algerine Captive." III. 1820–1876. The last period in American literature presents a marked contrast to those which preceded, in the national character as well as in the variety and extent of its productions. It was in 1820 that the poverty of American literature was sneeringly commented upon by Sydney Smith in an article in the "Edinburgh Review;" and from that date the intellectual development of the country, the political crisis which attended the establishment of the government being past, has been commensurate with its social and material progress, until at the present day there is no department of human knowledge which has not been explored by American authors. In history, in jurisprudence, and in certain departments of natural science and imaginative literature, many of their productions during the last 50 years deserve to be ranked among the best in the universal literature of the age. Within this period the style and tone of the national literature have begun to partake more decidedly of the national character, although in certain departments only, particularly in that of imaginative writing, has any decided originality been shown.—While in the periods already treated of, the labors of American historians were for the most part confined to the collection of materials or to the unadorned record of facts, their successors have taken a wider range of subjects, and infused a more philosophical spirit into their writings; and although, among the many hundred historical works already produced, few rise above the dignity of local narratives or compilations of materials, as storehouses of data they have been ably employed by those who can analyze the significance of events. Prominent among these is George Bancroft (born 1800), whose "History of the United States" has been pronounced "the most successful attempt yet made to reduce the chaotic but rich materials of American history to order, beauty, and moral significance." It is characterized by an earnest sympathy with democratic institutions, by a generous enthusiasm for the martyrs of freedom and civilization, by patient research and discrimination in the choice of authorities, and by a style animated and genial, although in occasional passages perhaps somewhat too labored. The work brings the history down to the close of the revolution, and the author, it is understood, proposes to continue it to a much later period. He has revised the ten volumes already issued and republished them in a "centenary" edition in six volumes (1876). The same subject has been ably treated by Richard Hildreth (1807–'65), whose work, bringing the narrative down to 1821, though written with no special attempt at rhetorical grace or picturesque effect, is valuable for its general accuracy, and has become a standard book of reference. Among the most successful of the writers of American history is Francis Parkman (born 1823), who has devoted himself to narrating the rise and fall of the French dominion in America. His "Pioneers of France," "Jesuits in North America," "Discovery of the Great West," "Old Régime in Canada," and "Conspiracy of Pontiac," form a series of the highest value, distinguished for accurate research, for brilliant style, and for profound knowledge of Indian character and manners, acquired by personal observation of the red man among the wildest tribes. Many school histories of the United States have been written, of which those by Salma Hale, S. G. Goodrich ("Peter Parley," 1793–1860), Samuel Eliot, Emma Willard, Benson J. Lossing, Marcius Willson, G. P. Quackenbos, J. J. Anderson, William Swinton, A. H. Stephens, G. F. Holmes, T. W. Higginson, Edward Abbott, and Abby S. Richardson may be cited. Intermediate between the school histories and the larger works are the compendious volume of J. H. Patton, which brings the narrative down to the beginning of the civil war, and "The Popular History of the United States," by W. C. Bryant and S. H. Gay, which is written with animation and is profusely illustrated. Among works illustrating particular periods or passages in the general history of the country may be mentioned the "Pictorial Field Book of the Revolution" and "Pictorial Field Book of the War of 1812," by B. J. Lossing; the "History of the United States Navy," by James Fenimore Cooper; histories of the war of 1812 by C. J. Ingersoll (1782–1862) and Lossing; the "American Archives" and other works by Peter Force; "Our First Hundred Years" (1874 *et seq.*), by C. Edwards Lester; and numerous minor productions by W. L. Stone (1792–1844), John Armstrong, W. H. Trescot, Brantz Mayer, Winthrop Sargent, Richard Frothingham, jr., J. T. Headley, J. Sprague, Frank Moore, and others. The war of 1861–'5 has given rise to a large class of works, most of them necessarily ephemeral, but some of which deserve special mention as histories or sources of history. Prominent among these are "The Rebellion Record" (1861–'71), edited by Frank Moore, a vast collection of documents in 12 volumes; "Reports of the Congressional Committee on the Conduct of the War;" "Annals of the United States Christian Commission," by Lemuel Moss; "The American Conflict," by Horace Greeley; "History of the American Civil War," by J. W. Draper; "History of the Rise and Fall of the Slave Power in America," by Vice President Henry Wilson; "The Campaigns of the Army of the Potomac" and "The Twelve Decisive Battles of the War," by William Swinton; "Report of the Army of the Potomac," by Gen. George B. McClellan; and "Memoirs of Gen. William T. Sherman, by Himself." All of these represent the Union side of the conflict, while on the confederate side the following are the principal works: "The War between the States," by A. H. Stephens; "History of the War of Secession," by J. F. H. Claiborne; "Southern History of the War" and "The Lost Cause," by E. A. Pollard; "Narrative of Military Operations," by Gen. Joseph E. Johnston; "Personal Reminiscences" of Lee, by J. W. Jones; lives of Lee and of "Stonewall" Jackson, by J. Esten Cooke; and various books by Alfriend, Howiston, H. A. Wise, G. C. Eggleston, and others. The list of histories of single states or groups of states, of special territorial districts, or of institutions, presents many works of merit. At the head of these perhaps stands the "History of New England," by J. G. Palfrey (born 1796), of which four volumes, embracing the events previous to 1741, have been published. The subject is treated with more fulness than in the work of Bancroft, and in a style of singular purity and finish. To this class belong the valuable "Geography and History of the Mississippi Valley" by Timothy Flint (1780–1840), the "History of the Discovery and Exploration of the Mississippi" and other works by J. G. Shea, the "New England History" by C. W. Elliott, those of the New Netherlands by E. B. O'Callaghan, of New York by John Romeyn Brodhead, of Connecticut by Theodore Dwight and by G. H. Hollister, of North Carolina by F. L. Hawks, of Kentucky by Mann Butler, of Louisiana by Charles Gayarré and by F. X. Martin, of Oregon and the N. W. coast of North America by Robert Greenhow, of South Carolina by W. G. Simms, of Texas by H. Yoakum, of Rhode Island by S. G. Arnold, of Virginia by Charles Campbell, of Western Massachusetts by J. G. Holland and by R. R. Howiston, of Delaware by Francis Vincent, of Maryland by James McSherry, of Indiana by J. B. Dillon, of Pennsylvania and New Jersey by J. R. Sypher, of Wisconsin by W. R. Smith, of Kentucky by Lewis Collins, and of Illinois by Alexander Davidson. Of the numerous minor works of this class, the elaborate history of Boston by S. G. Drake, and of Westchester county, N. Y., by Robert Bolton, and that of Harvard university by Josiah Quincy, may be cited as examples. The history of the aboriginal tribes has been ably treated by S. G. Drake, whose "History and Biography of the Indians of North America" was the first attempt at an impartial narrative of the subject, and is a valuable repertory of facts; by T. L. McKenney and James Hall, who published a costly illustrated "History of the Indian Tribes of North America;" by George Catlin; by W. L. Stone; by L. H. Morgan, author of "The League of the Iroquois;" and especially by Henry Rowe Schoolcraft (1793–1864), whose works, although they come perhaps more naturally within the departments of travels and ethnography, evinced a more intimate acquaintance with the history, languages, and customs of the North American aborigines than any others then published. His elaborate "Historical and Statistical Information respecting the History, Condition, and Prospects of the Indian Tribes of the United States," the most considerable work of the class then undertaken, is in 6 vols. 4to. The works relating directly or indirectly to the history of the United States include C. W. Upham's account of the Salem witchcraft in 1692, R. S. Ripley's "War with Mexico," E. D. Mansfield's "Mexican War," G. W. Kendall's "Santa Fé Expedition," and Theodore Irving's "Conquest of Florida." Among American authors whose labors have been prosecuted beyond the limits of local or domestic history, no name stands higher than that of William Hickling Prescott (1796–1859), the historian of the Spanish conquest and civilization in the new world, and one of the most graceful writers of the English language. His histories of the reigns of Ferdinand and Isabella and Philip II. of Spain, and of the "Conquest of Mexico" and the "Conquest of Peru," and his sequel of Robertson's "History of Charles V.," exhibit remarkable depth and accuracy of research, combined with impartiality and soundness of judgment. The style is at the same time so lucid and attractive as frequently to invest the narrative with the charm of fiction. As Prescott was the first to treat adequately the brilliant period of Spanish ascendancy, so the revolt of the Spanish provinces of the Netherlands and their history as a free Protestant commonwealth have afforded a congenial subject to John Lothrop Motley (born 1814), whose "Rise of the Dutch Republic," "History of the United Netherlands" (a continuation of the former), and "Life and Death of John of Barneveld" display extensive research, and are written with animation, and occasionally with great picturesque beauty. His works have taken their place among the great histories of the time, and have been translated into the principal languages of Europe. Among other writers of foreign history are Henry Wheaton, author of a "History of the Northmen;" Archibald Alexander, author of a "History of the Colonization of the West Coast of Africa;" Brantz Mayer, J. R. Poinsett, and R. A. Wilson, who have written on Mexico; Parke Godwin, who has published the first volume of a comprehensive "History of France;" J. F. Kirk, author of an elaborate history of Charles the Bold; C. C. Felton (1807–'62), who edited Smith's "History of Greece" and wrote a valuable work on "Greece, Ancient and Modern;" G. M. Towle, author of a history of Henry V. of England; John Lord, D. O. Allen, A. L. Koeppen, J. J. Jarves, Edmund Flagg, W. H. Stiles, and G. W. Greene. Many excellent works in the department of ecclesiastical or religious history have also been produced, prominent among which are the "Annals of the American Pulpit," by W. B. Sprague; "History of the Presbyterian Church," by Charles Hodge, and also by E. H. Gillett; "History of the Apostolic Church," by Philip Schaff; "Progress of Religious Ideas," by Mrs. Lydia Maria Child; "The Ten Great Religions," by James Freeman Clarke; "The Oriental Religions," by Samuel Johnson; "History of Methodism," by Abel Stevens; "Modern History of Universalism," by Thomas Whittemore; "Post-Biblical History of the Jews," by M. J. Raphall; "Ecclesiastical History of New England," by J. B. Felt; the contributions to the history of the Protestant Episcopal church in Virginia, by Bishop William Meade and F. L. Hawks; the "History of the Baptist Denomination," by D. Benedict; "The English Bible, a History of the Translation of the Holy Scriptures into the English Tongue," by Mrs. H. C. Conant; and various works by Archibald Alexander, James Murdock, S. F. Jarvis, Robert Baird, Thomas Gaillard, W. Ingraham Kip, John Dowling, J. A. Spencer, Robert Davidson, S. J. Baird, W. E. Schenck, W. G. T. Shedd, H. B. Smith, C. P. Krauth, and many others. To the department of literary history, the most important contributions are the "History of Spanish Literature," by George Ticknor, esteemed the best work on the subject extant; the several works of R. W. Griswold on the "Prose Writers," the "Poets," and the "Female Poets" of America; Caroline May's "American Female Poets;" J. S. Hart's "Female Poets of America," and his "Manuals" of English and American literature; T. Buchanan Read's "Female Poets of America;" Mrs. A. C. L. Botta's "Handbook of Universal Literature;" C. D. Cleveland's compendiums of English, American, and classical literature; C. A. Dana's "Household Book of Poetry;" W. T. Coggeshall's "Poets and Poetry of the West;" J. Wood Davidson's "Living Writers of the South;" Whittier's "Three Centuries of Song;" A. C. Kendrick's "Our Poetical Favorites;" and Emerson's "Parnassus." In this category may properly be placed Wheeler's "Noted Names of Fiction" and the excellent "Familiar Quotations" of John Bartlett. The "Cyclopædia of American Literature," by E. A. and G. L. Duyckinck, is the only comprehensive work on the subject yet published; and the "Critical Dictionary of English Literature," by S. Austin Allibone, forms a valuable epitome of the literary history of England and the United States. Among miscellaneous works are the "History of Civilization," in seven volumes, by Amos Dean; the "History of the Intellectual Development of Europe," by J. W. Draper; and the "History of Liberty," by Samuel Eliot, the completed portion of which, covering the history of the ancient Romans and the early Christians, and the struggle for constitutional liberty in Spain in the 16th century, is written with ability and in a philosophic spirit.—The first in point of date and reputation among the writers of biography of this period is Washington Irving (1783–1859), whose narratives of the "Life and Voyages of Christopher Columbus" and of the "Voyages and Discoveries of the Companions of Columbus," though not the most characteristic of his writings, constitute a permanent contribution to English and American literature. His "Life of George Washington," completed a few months before the author's death, has been more generally read in America than any other of his works. The narrative, embracing necessarily the main incidents of the revolutionary struggle, is related with charming vivacity and great elegance of language. His lives of Mahomet and Goldsmith are pleasing compilations, having little claim to originality. Among the most industrious laborers in the field of American biography is Jared Sparks (1789–1866), who devoted the greater part of his life to studies illustrative of the history of his country, and whose works, written in a sober and correct style, display remarkable diligence of research. The "Library of American Biography," in two series and 25 volumes, edited by him, to which he contributed lives of John Ledyard, Benedict Arnold, Ethan Allen, Charles Lee, Father Marquette, and others, is enriched by contributions from some of the best writers in the country. Mr. Sparks also edited the writings of Washington and Franklin, with lives of each, the diplomatic correspondence of the revolution, and the correspondence of public men with Washington. Of the many biographies of public men produced during this period, the most prominent are those of Josiah Quincy, jr., by his son Josiah Quincy, of Josiah Quincy by his son Edmund Quincy, of Elbridge Gerry by J. T. Austin, of James Otis by William Tudor, of Joseph Reed by his grandson W. B. Reed, of William Wirt by John P. Kennedy, of Thomas Jefferson by George Tucker and by H. S. Randall, of John Adams and John Quincy Adams by Charles Francis Adams, of James Madison by W. C. Rives, of Joseph Story by his son W. W. Story, of Alexander Hamilton by his son J. C. Hamilton, of Timothy Pickering by his son Octavius Pickering (the last 3 vols. by C. W. Upham), of Henry Clay by Calvin Colton, of Aaron Burr, Andrew Jackson, Benjamin Franklin, Thomas Jefferson, Horace Greeley, and B. F. Butler by James Parton, of John P. Kennedy by H. T. Tuckerman, and of Count Rumford by G. E. Ellis, some of which have obtained a wide popularity. Among special biographies of American subjects are the "Life of William Ellery Channing," by his nephew William Henry Channing; the "Memoirs of Margaret Fuller Ossoli," by W. H. Channing, Ralph Waldo Emerson, and James Freeman Clarke; the "Life of Daniel Boone," by Timothy Flint; lives of Marion, Greene, and Captain John Smith, by W. G. Simms; the lives of the Indian chiefs Joseph Brant and Red Jacket, by W. L. Stone; the life of Bishop A. W. Griswold, by J. S. Stone; "Memoir of Rev. Dr. Buckminster and Joseph Stevens Buckminster," by Mrs. Eliza Buckminster Lee; the "Life of Theophilus Parsons," by his son Theophilus Parsons; "Memoirs of Nathanael Emmons," by E. A. Park; the "Life of Washington Irving," by his nephew Pierre M. Irving; of Nathanael Greene, by his grandson, G. W. Greene; of Daniel Webster, by G. T. Curtis; of Abraham Lincoln, by Ward H. Lamon; of Theodore Parker, by John Weiss, and a later and more popular one by O. B. Frothingham; of W. H. Prescott, by George Ticknor; of Fitz-Greene Halleck, by J. G. Wilson; of John Todd, by his son John E. Todd; and John Bigelow's edition of Franklin's autobiography; besides many biographical sketches by Alexander Slidell Mackenzie, G. E. Ellis, Edward and Alexander H. Everett, H. A. Garland, C. C. Felton, C. W. Upham, Henry Wheaton, W. H. Prescott, Henry Reed, G. S. Hillard, William Gammell, J. T. Headley, John Sanderson, R. T. Conrad, C. A. Goodrich, M. L. Davis, Alden Bradford, S. L. Knapp, Nicholas Biddle, Epes Sargent, Richard Frothingham, B. J. Lossing, G. L. Duyckinck, Mrs. L. M. Child, Mrs. E. F. Ellet, and others. To this class also belong such works as the "Lives of American Loyalists," by Lorenzo Sabine; the "Personal Memoirs" of Joseph T. Buckingham; the "Reminiscences" of Bishop Philander Chase; "Recollections of a Busy Life," by Horace Greeley; "Autobiography of Lyman Beecher;" the "Ten Years of Preacher Life" and other works of William Henry Milburn; the "Threading my Way" of Robert Dale Owen; and "The Life, Letters, and Journals" of George Ticknor, edited by G. S. Hillard. The contributors to miscellaneous and foreign biography comprise J. S. C. Abbott, author of a "Life of Napoleon," R. W. Griswold, H. W. Herbert, Samuel Osgood, J. Milton Mackie, Hannah F. Lee, X. Donald McLeod, Alfred Lee, Richard Hildreth, F. L. Hawks, Bishop J. R. Bayley, R. H. Wilde, and many others. Female biography has been comprehensively related by Mrs. S. J. Hale in her "Woman's Record," a sketch of distinguished women in all times. The principal biographical dictionaries are those of William Allen and Francis S. Drake, both devoted to American subjects, and the "Universal Pronouncing Dictionary of Biography and Mythology," by Joseph Thomas, a valuable and comprehensive work; besides which a "Dictionary of Painters, Sculptors, and Engravers" has been published by S. Spooner, a "Cyclopædia of Music" by J. W. Moore, a handbook of painters, sculptors, and other artists by Clara Erskine Clement, and a "Book of the Artists" by Henry T. Tuckerman.—Washington Irving, though not exclusively a writer of prose fiction, was the first American whose fame in this department extended beyond the limits of his native country; and his "Sketch Book," "Knickerbocker's History of New York," "Bracebridge Hall," and "Tales of a Traveller," first introduced to a European public between 1820 and 1830, attracted immediate attention by their imaginative power, by their fine pathos and humor, and by the singularly pure and graceful style in which they were expressed. James Fenimore Cooper (1789–1851) has the credit of giving the first decided impulse to romantic fiction in the new world, and through his works American literature became first generally known abroad. His "Spy," his nautical tales, including "The Pilot" and "The Red Rover," and above all his series of Indian stories, abounding in lively pictures of forest life, took a strong hold upon the popular mind in both hemispheres. He was deficient in some of the requisites of a novelist; but his faculty of description, and quick appreciation of what was tangible and characteristic in his native land, enabled him to gain a universal distinction almost unsurpassed in his field. The success of Cooper gave to the novel of adventure and backwoods life, or that founded upon colonial and revolutionary incidents, a popularity which caused it for a long time to be the chief form of fiction cultivated; and among many meritorious works of this class may be mentioned "The Dutchman's Fireside" and "Westward Ho" of James

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* Died in office. † Resigned.

Kirke Paulding (1779–1860); "Swallow Barn," "Horse Shoe Robinson," and "Rob of the Bowl," by John Pendleton Kennedy (1795–1870); "Redwood," "Hope Leslie," "The Linwoods," and other pleasing pictures of early American life, by Miss C. M. Sedgwick (1789–1867); "The Partisan," "The Yemassee," "Mellichampe," "Guy Rivers," and numerous other tales by W. G. Simms (1806–'70), one of the most prolific of American authors, who drew largely from the legendary history of the southern states for his materials; "Hobomok" and "The Rebels," by Mrs. L. M. Child (born 1802); "Seventy-Six" and other works by John Neal (born 1793); "A New Home," by Mrs. C. M. Kirkland (1801–'64); the "Nick of the Woods" and other border tales of Dr. Robert M. Bird (1803–'54); and works by Timothy Flint (1780–1840), James Hall (1793–1868), C. F. Hoffman (born 1806), T. B. Thorpe, C. W. Webber, and others. For finish of style, delicacy of psychological insight, and power in delineating the darker features of life and the emotions of guilt and pain, Nathaniel Hawthorne (1804–'64) holds a peculiar place among American novelists. Writing on national subjects, and delighting especially in the gloomy passages of New England colonial history, he employed fiction less for the purpose of illustrating practical life, or of adding to the creations of the imaginative world, than of solving psychological problems. His "Scarlet Letter" and "House of the Seven Gables" were preceded by a variety of fancy sketches and historical narratives, published under the titles of "Twice-Told Tales" and "Mosses from an Old Manse," which in point of style and subtle analysis of character are among the most exquisite productions of American literature. The "Blithedale Romance," the next in the order of his novels, is marked by similar characteristics; and the "Marble Faun," the most elaborate of his works, contains pictures of Italian life and scenery of unsurpassed beauty. His posthumous novel "Septimius Felton" exhibits in strong degree the morbid and mystical tendencies of his earlier works. The "Tales of the Grotesque and Arabesque," and other fictions, by Edgar Allan Poe (1809–'49), exhibit extraordinary metaphysical acuteness and a wild and gloomy imagination; but his analytical power, unlike that of Hawthorne, is seldom pervaded by any moral sentiment, and his finest creations, though they are elaborated with skill, have little human interest. N. P. Willis (1806–'67) obtained a unique reputation as a delineator of the lights and shadows which flit over the surface of society, and his style, remarkable for its felicity, not to say happy audacity of expression, is in accord with his subjects. His prose writings, though including many tales, belong perhaps more properly to the departments of travels and belles-lettres. As pictures of domestic life among the ancients, the "Zenobia," "Probus," and "Julian" of William Ware (1797–1852) are not surpassed by any similar productions in English literature. To this class also belong "Philothea," a tale of Athens in the days of Pericles, by Mrs. Child, and "The Roman Traitor," by Henry William Herbert (1807–'58), well known under the pseudonyme of "Frank Forester." For invention and graphic power Herman Melville's tales of ocean adventure, including "Typee" and "Omoo," stand perhaps at the head of their class in American literature. The "Kaloolah" and "Berber" of W. S. Mayo are successful attempts in the same field. His later work, "Never Again," is in a different vein, and depicts society in the city of New York. One of the most popular novels of the present century was the "Uncle Tom's Cabin" of Mrs. Harriet Beecher Stowe, an anti-slavery fiction, which has circulated by millions of copies in many languages, and deeply moved the public heart in Europe and America, not more on account of the moral of the story than of its pathos, its humor, and its inimitable pictures of negro life. "Dred," her second anti-slavery romance, has perhaps more power than its predecessor, although it is less popular; and among her subsequent productions are the "Minister's Wooing," remarkable for its pictures of social and religious life in New England during the last century, the "Pearl of Orr's Island," "Agnes of Sorrento," "Old Town Folks," "My Wife and I," "Pink and White Tyranny," and "We and our Neighbors." The last three are satires on social and domestic evils. Of other novels founded upon the slavery question, "The White Slave," by Richard Hildreth, and "Ida May," by Mary Langdon (Mrs. Pike), may be cited as examples. Of prose fictions by authors who have won distinction principally in other walks of literature, the most deserving of notice are "Monaldi," by Washington Allston (1779–1843); "Paul Felton" and other tales published by R. H. Dana (born 1787) in the "Idle Man," a serial edited by himself; "Hyperion," a series of charming pictures of scenery and manners in Europe, connected by a thread of story, and "Kavanagh," by H. W. Longfellow (born 1807); "Leaves from Margaret Smith's Journal," by J. G. Whittier (born 1807); and "Elsie Venner" and "The Guardian Angel," by O. W. Holmes (born 1809). Among the younger writers of fiction, the most conspicuous are Bayard Taylor, whose "Hannah Thurston," "John Godfrey's Fortunes," "Story of Kennett," and "Joseph and his Friend" are careful and accurate pictures of American life and manners; Theodore Winthrop, whose death as a Union soldier in one of the earliest battles of the civil war gave to his "Cecil Dreeme," "John Brent," and other works, all posthumous, a sudden popularity, which, notwithstanding their merits, does not seem to be permanent; W. D. Howells (born 1837), whose "Suburban Sketches," "Their Wedding Journey," "A Chance Acquaintance," "A Foregone Conclusion," and "Private Theatricals" are distinguished by a charming style and a subtle and pleasant humor; and Julian Hawthorne, a son of Nathaniel (born 1846), who has attracted attention by novels of great promise, "Bressant," "Idolatry," and "Garth," which in style and tone exhibit many of his father's characteristic qualities. The humorous writers are represented by Seba Smith (1792–1868), author of the well known letters of "Major Jack Downing," Cornelius Mathews (born 1817), J. C. Neal (1807–'48), R. C. Sands (1799–1832), W. G. Clark (1810–'41), G. H. Derby (1824–'61), F. S. Cozzens (1818–'69), G. D. Prentice (1802–'70), and C. F. Briggs; besides Irving, whose "Knickerbocker's History of New York" is perhaps the most elaborate piece of humor in the national literature; Paulding, who in conjunction with Irving produced the "Salmagundi;" and some others mentioned above. Holmes has a copious vein of original humor, which appears to the best advantage in his poems and miscellaneous prose writings. The list of American humorous writings would be incomplete without an allusion to that class of grotesque tales of which the "Big Bear of Arkansas" and the "Quarter Race in Kentucky," by T. B. Thorpe, afford characteristic specimens. Among later humorists are Bret Harte, S. L. Clemens ("Mark Twain"), C. F. Browne ("Artemus Ward"), D. R. Locke ("Petroleum V. Nasby"), R. H. Newell ("Orpheus C. Kerr"), Charles G. Leland ("Hans Breitmann"), C. H. Webb ("John Paul"), and R. G. White (author of "The New Gospel of Peace"). Among other writers of prose fiction may be enumerated Sylvester Judd (1813–'53), author of "Margaret," a tragic tale of New England life, and "Richard Edney;" T. S. Fay, G. P. Thompson, T. S. Arthur, J. V. Huntington, J. T. Trowbridge, L. M. Sargent, F. W. Shelton, George Wood, J. H. Ingraham, P. P. Cooke, J. E. Cooke, J. G. Holland, R. B. Kimball, X. Donald McLeod, G. W. Curtis, A. S. Roe, E. P. Roe, H. P. Myers, J. B. Cobb, Robert T. S. Lowell, Edgar Fawcett, W. D. O'Connor, Henry James, jr., W. H. Peck, Theodore Tilton, Charles Dimitry, E. E. Hale, James De Mille, J. W. De Forest, T. W. Higginson, Frank Lee Benedict, and T. B. Aldrich. The female writers of fiction of this period constitute a numerous and important body, and the works of some of them are not exceeded in popularity by any contemporary writings of their class. It will suffice to mention, in addition to works already referred to, the several series of "Pencil Sketches," by Miss Eliza Leslie (1787–1858); the "Three Experiments of Living," by Mrs. H. F. Lee; "The Wide, Wide World" and "Queechy," by Miss Susan Warner; "Fern Leaves," "Ruth Hall," and other popular productions, by Mrs. S. P. W. Parton ("Fanny Fern"); "The Household of Bouverie," by Mrs. C. A. Warfield; "Naomi," by Mrs. E. B. Lee; "Charms and Counter-Charms," by Miss M. J. McIntosh; besides numerous volumes by Mrs. Hale, Mrs. E. C. Embury, Mrs. C. L. Hentz, Mrs. A. S. Stephens, Mrs. E. Oakes Smith, Mrs. Ellet, Mrs. A. C. (Mowatt) Ritchie, Mrs. E. D. E. N. Southworth, Miss A. B. Warner, Mrs. E. S. Phelps (Trusta), Mrs. A. B. (Neal) Haven, Miss Alice Cary, Miss Caroline Chesebro', Mrs. E. Robinson ("Talvi"), Miss Maria S. Cummins, Mrs. Harriet (Prescott) Spofford, Mrs. Virginia Terhune ("Marion Harland"), Mrs. A. J. (Evans) Wilson, Mrs. Martha T. Lamb, Mrs. M. J. Holmes, Mrs. M. H. Eastman, Mrs. Elizabeth Stoddard, Mrs. M. A. Sadlier, Mrs. M. A. Denison, Mrs. M. C. Lawrence, Miss Amanda M. Douglas, Miss Frances C. Fisher, Miss Louisa M. Alcott, Miss Anna E. Dickinson, Mrs. A. M. Seemuller, Mrs. Mary Healy Bigot, Mrs. Jane G. Austin, Mrs. R. H. Davis, and many others.—In intimate connection with the departments already treated is that of juvenile literature, to which several authors have exclusively devoted themselves, and among the contributors to which are many of those previously mentioned. S. G. Goodrich's numerous little books for children, published under the pseudonyme of "Peter Parley," have had a prodigious circulation in Europe as well as America. Nathaniel Hawthorne wrote some delightful tales for children; Jacob Abbott (born 1803) is the author of the popular "Rollo," "Lucy," "Franconia," and other series of stories, and of numerous juvenile histories; and W. M. Simonds, John Bonner, F. C. Woodworth, George Taylor, Charles Nordhoff, William T. Adams ("Oliver Optic"), Elijah Kellogg, Frank R. Stockton, Horatio Alger, jr., Mrs. E. C. Judson ("Fanny Forester," 1817–'54), Mrs. Lippincott ("Grace Greenwood"), Mrs. Sigourney, Miss C. M. Sedgwick, Miss McIntosh, Mrs. L. C. Tuthill, Mrs. Parton, Mrs. L. M. Child, Mrs. A. B. (Neal) Haven, Miss L. M. Alcott, Mrs. H. C. Knight, Mrs. A. A. Carter, Mrs. E. S. Phelps and her daughter Miss E. S. Phelps, Mrs. Hubbell, Mrs. Helen Kendrick Johnson, Mrs. L. C. Moulton, Mrs. A. M. Diaz, Mrs. Mary Mapes Dodge, Mrs. Fanny Barrow, Miss Sarah C. Woolsey ("Susan Coolidge"), and many others have devoted a large portion of their time to this species of literature.—The poetry of this period has shown a remarkably healthy and abundant development; and it is probable that the number of writers is more numerous here than in any other country. Notwithstanding also the limited range of native subjects, which makes the imaginative literature of the country in some respects an imitation or rather a continuation of that of other lands, the characteristic features of national scenery, legend, and history have not failed of illustrators, while the familiar imagery of an older civilization has been often reproduced with force and originality. Among those who have made a felicitous use of native materials, one of the most eminent and thoroughly American is William Cullen Bryant (born 1794), whose poems, the fruits of meditation rather than of passion or imagination, are remarkable for their descriptive powers, their serene and elevated philosophy, and noble simplicity of language. Richard H. Dana was one of the first in America to break away from the school of Pope, and his "Buccaneer," a narrative of crime and retribution, had no slight influence in directing the poetical taste of the country. Charles Sprague (1791–1875) wrote an "Ode to Shakespeare," a metrical essay on "Curiosity," and a few other pieces. J. G. Percival (1795–1856) possessed a remarkable command of language and metre, and his "Coral Grove" and "New England" are established favorites. The few poetical remains of Washington Allston (1779–1843), including the "Sylphs of the Seasons," evince an exuberant fancy and much metrical skill. Joseph Rodman Drake (1795–1820) produced "The Culprit Fay," an imaginative poem, exquisitely versified. Fitz-Greene Halleck (1790–1867) wrote little, but during his life was one of the most popular of American poets, and his "Marco Bozzaris" is still universally known among his countrymen. The Scripture pieces of N. P. Willis are written with feeling and artistic finish; in his other poems the verbal felicity and sprightly fancy characteristic of his prose writings are discernible. The few brief poems of Ralph Waldo Emerson (born 1803), of which "The Problem" and the lines "To a Humble Bee" afford examples, are remarkable for their quaintness and originality. The early song writers of the period are represented by G. P. Morris (1802–'64), the most popular of his class in America, Edward Coate Pinkney (1802–'28), and C. F. Hoffman, whose amatory or convivial verses are gracefully written and well adapted to music. Among other early writers of the period who are remembered for one or more successful poems are F. S. Key (1779–1843), author of the "Star-Spangled Banner;" Samuel Woodworth (1785–1842), of "The Old Oaken Bucket;" R. H. Wilde (1789–1847), of the song "My Life is like the Summer Rose;" and John Howard Payne (1792–1852), whose "Home, Sweet Home" is known wherever the English language is spoken. Among later song writers is Stephen C. Foster (1826–'64), the most popularly successful and the most peculiarly American of all. The poems of E. A. Poe form a fitting accompaniment to his prose writings, and are characterized by a shadowy and gloomy imagination, and a fascinating melody of rhythm. "The Raven" illustrates his facility in harmonizing sentiment with rhythmical expression; and his "Annabel Lee," "Haunted Palace," and "Bells" are constructed with equal skill. The most artistic and cosmopolitan of American poets, and the most widely read abroad, is H. W. Longfellow, whose genius has been powerfully influenced by the literature and historic associations of the old world, while in the choice and treatment of his principal subjects he is eminently American. Much of the poetry of J. G. Whittier was prompted by his opposition to slavery, and in occasional pieces he rises to a strain of genuine lyrical exaltation. Of this character are his "Massachusetts to Virginia" and "Astræa at the Capitol." In other poems he unites tenderness and grace with much simplicity of language. All of his descriptive poems, but especially "Snow-Bound," his masterpiece, are strikingly national. James Russell Lowell (born 1819) is one of the most versatile poets of this period, and has won high reputation as a prose writer by several volumes of essays, chiefly on literary topics. His serious poems are earnest and philanthropic in tone, elevated in sentiment, and of high artistic merit. He is perhaps the ablest of American satirists, and has gained a unique reputation as a humorist by his "Biglow Papers," in which the peculiar phraseology of New England is given with great verbal and idiomatic correctness. The prose introductions to these poems have a subtle humor which can be best appreciated by those familiar with the local peculiarities they illustrate. Not less conspicuous as a humorist is O. W. Holmes, the most effective writer of the school of Pope, and distinguished by a clear, concise, and manly style. For the mingled pungency and geniality of his humor he is unrivalled among American poets. In his knowledge of local dialects and idioms he is not inferior to Lowell. J. G. Saxe (born 1816) is known chiefly as a humorous poet, and his verses enjoy considerable popularity. A. B. Street (born 1811) has devoted himself more than any other native poet to the romantic aspects of American scenery and forest life, and his works contain many striking and picturesque descriptive passages. Among other poets and occasional writers of verses of this period, all of whom have produced some pieces of high merit, are John Pierpont (1785–1866), John Neal, J. G. Brainard, Andrews Norton (1786–1853), Henry Ware, jr. (1794–1843), W. G. Simms, R. C. Sands, G. W. Doane, A. G. Greene, Rufus Dawes, Sumner Lincoln Fairfield, James Aldrich, George Lunt, G. W. Bethune, G. D. Prentice, Grenville Mellen, William Croswell, Thomas Ward, W. D. Gallagher, Park Benjamin, Albert Pike, Jones Very, Ralph Hoyt, W. G. Clark, Seba Smith, W. E. Channing, H. T. Tuckerman, H. B. Hirst, W. H. C. Hosmer, Epes Sargent, T. W. Parsons, A. C. Coxe, G. H. Colton, W. W. Story, W. R. Wallace, T. D. English, C. G. Eastman, P. P. Cooke, C. P. Cranch, W. H. Burleigh, Isaac McLellan, and J. T. Fields; and among the younger writers, J. R. Thompson, G. H. Boker, T. B. Read, Bayard Taylor, R. H. Stoddard, W. Allen Butler, P. H. Hayne, C. G. Leland, R. T. S. Lowell, T. B. Aldrich, A. J. H. Duganne, E. C. Stedman, W. B. Wright, B. F. Taylor, H. H. Brownell, Forceythe Willson, R. W. Wright, J. T. Trowbridge, William Winter, Joaquin Miller, John Hay, Bret Harte, Henry Timrod, George Arnold, R. W. Gilder, G. P. Lathrop, and Walt Whitman, whose unrhymed and rhapsodical poems, severely criticised at home, have found their warmest admirers in England. The female poets of the period comprise Mrs. L. H. Sigourney (1791–1865), author of many beautiful pieces characterized by feminine delicacy and religious sentiment; Mrs. Maria Brooks ("Maria del' Occidente," 1795–1845), whose principal poem, "Zophiel," evinces a high degree of imaginative power; Lucretia Maria Davidson (1808–'25), and her sister Margaret Miller Davidson (1823–'38), who are instances of rare though melancholy precocity; Mrs. Frances Sargent Osgood (1811–'50), remarkable for her playfulness of fancy and facility of expression; Mrs. Julia Ward Howe (born 1819), whose "Passion Flowers" and other poems are distinguished by a peculiar earnestness of feeling and expression; Mrs. Frances Anne Kemble (born 1811), who exhibits similar characteristics; Mrs. E. Oakes Smith, author of a melodious and imaginative poem entitled "The Sinless Child;" Mrs. Margaret J. Preston, whose chief poem, "Beechenbrook," was very popular in the south during the civil war; Mrs. Caroline Gilman, Mrs. S. J. Lippincott, Mrs. A. B. Welby, Miss H. F. Gould, Mrs. E. C. Embury, Mrs. Sarah Helen Whitman, Mrs. A. C. (Lynch) Botta, Mrs. Estelle Anna Lewis, Mrs. Haven, Miss Alice Cary and her sister Phœbe Cary, Mrs. E. F. Ellet, Mrs. S. J. Hale, Miss Caroline May, Mrs. Maria Lowell, Miss Edna Dean Proctor, Mrs. Rosa Vertner (Jeffrey), Mrs. L. V. French, Mrs. M. S. B. Dana (Shindler), Mrs. S. M. B. Piatt, Mrs. E. C. Kinney, Miss Emma Lazarus, Mrs. Celia Thaxter, Miss Lucy Larcom, Mrs. Rose Terry Cooke, Mrs. Elizabeth (Akers) Allen, Miss Laura C. Redden ("Howard Glyndon"), Mrs. Helen Hunt (Jackson), and many others. Dramatic literature has been cultivated by comparatively few writers, and, with occasional exceptions, nothing of very decided mark, either in style, sentiment, or plot, has yet been accomplished. J. A. Hillhouse (1789–1841) excelled in that species of poetic literature illustrated by the writings of Browning, Henry Taylor, and others in England, which may be called the written drama. His "Hadad," founded upon Jewish tradition, "Percy's Masque," and other dramas, though unfitted for representation, are conceived with taste and carefully finished. G. H. Boker has produced "Calaynos," a tragedy founded on an incident in the history of the Spanish Moors, and other dramatic pieces of more than ordinary merit; and Mrs. J. W. Howe, a high-wrought drama entitled "The World's Own." Among other works of this class may be mentioned "Brutus," by J. H. Payne; "Metamora," by J. A. Stone; "Jack Cade," by R. J. Conrad; "Tortesa the Usurer" and "Bianca Visconti," by N. P. Willis; "Velasco," by Epes Sargent; "The Gladiator," by R. M. Bird; "Witchcraft," by Cornelius Mathews; "Fashion," by Mrs. A. C. (Mowatt) Ritchie; "The Prophet," by Bayard Taylor; and "The Spanish Student," "Christus," and "Masque of Pandora," by H. W. Longfellow. Several of these have proved good acting plays, and still retain possession of the stage. Several writers have executed metrical translations of merit from the German, Italian, and other languages. The most eminent of these are Longfellow, whose translation of Dante is the best in the English language, and whose versions of Bishop Tegnér's "Children of the Lord's Supper" and *Der schwarze Ritter* and other ballads by Uhland are well known; Bryant, who has made an excellent version of Homer; and Bayard Taylor, who has made a masterly rendering of Goethe's *Faust* in the original metres. C. P. Cranch has made a good translation of Virgil's Æneid. C. T. Brooks has translated *Faust*, Schiller's *Wilhelm Tell*, Richter's *Titan* and *Hesperus*, and numerous other pieces from the German; C. G. Leland, the choicest songs of Heine; W. H. Furness, Schiller's "Song of the Bell;" and N. L. Frothingham and J. S. Dwight, many of the minor poems of this and other German authors. T. W. Parsons has made one of the best English translations of Dante's *Inferno;* George Ticknor has versified choice extracts from the Spanish poets; and R. H. Wilde, Dr. Mitchell, and Mrs. Nichols have translated with taste from Tasso, Sannazaro, and Manzoni.—Under the head of criticism, essays, belles-lettres, lectures or discourses, and that species of miscellaneous works which owe their charm to a felicitous blending of fact and fancy, or of sentiment and thought, may be classed a numerous body of authors who were so inadequately represented in the two preceding periods that the department now under consideration may almost be said to have sprung into existence since 1820. The establishment of the "North American Review" in 1815, followed by that of the "American Quarterly Review," the "Southern Quarterly Review," the "Christian Examiner," the "Knickerbocker Magazine," the "Dial," "Harper's Monthly," "Putnam's Monthly," the "Atlantic Monthly," and other periodicals, gave the first considerable impulse to literary criticism and essay writing on a comprehensive and philosophic scale; and the production of the essays of William Ellery Channing (1780–1842) on "National Literature," "Milton," "Napoleon Bonaparte," "Fénelon," and "Self-Culture," and of the thoughtful and highly finished articles by R. H. Dana, published in his own "Idle Man" and the "North American Review," may be said to have formed an era in the literary history of the country. Contemporary with these were John Quincy Adams, William Tudor, Joseph Story, Edward and A. H. Everett, W. H. Prescott, F. C. Gray, George Ticknor, E. T. Channing, Robert Walsh, G. C. Verplanck, J. G. Palfrey, Jared Sparks, Samuel Gilman, William Ware, R. C. Sands, Orville Dewey, Dr. J. W. Francis, W. G. Simms, John Neal, Francis Wayland, Henry Reed, F. L. Hawks, C. S. Henry, J. T. Buckingham, and

H. S. Legaré, most of whom have written with taste upon subjects connected with philosophy, morals, political and social economy, and general literature. Prominent among the later essayists is R. W. Emerson, an original and independent thinker, whose views of religion and in some degree of society may be described as the opposite of all those founded upon tradition and authority. He has written in an abstract manner upon social, moral, and political questions; and his style, though sometimes obscure by reason of his attempts to condense a philosophic theory into a few brief terms, has a finished beauty and significance which have secured him a wide circle of admirers, particularly in New England. His published works comprise several series of "Essays," "The Method of Nature," "Representative Men," "English Traits," "The Conduct of Life," "Society and Solitude," and "Letters and Social Aims," several of which have been expanded from lectures and addresses, a department of literature to which he has principally devoted himself. Of the school of Emerson was Margaret Fuller Ossoli (1810–'50), author of "Woman in the Nineteenth Century," an earnest protest against the commonly received views of the social position of women, and "Papers on Literature and Art," some of which originally appeared in the "Dial," a quarterly publication which was for several years the organ of Emerson and his friends. In general acquirements and conversational powers she was probably the most noted woman of her time in America. The most conspicuous names of other writers in this department are those of E. P. Whipple, author of many papers, chiefly on literature, written in a lively and perspicuous style; H. T. Tuckerman, whose contributions to critical literature show a refined taste and a liberal cultivation of mind and heart; O. A. Brownson, a bold and powerful writer on religion, metaphysics, and politics; J. R. Lowell, whose essays "Among my Books" show wide reading in several languages, and much subtle thought; John Fiske, whose "Outlines of Cosmic Philosophy" is a lucid exposition of the doctrine of evolution; G. S. Hillard, C. C. Felton, F. H. Hedge, G. E. Ellis, W. H. Furness, W. B. O. and O. W. B. Peabody, G. H. Calvert, Henry Giles, Mrs. Mary Lowell Putnam, R. W. Griswold, J. F. Clarke, A. P. Peabody, C. H. Brigham, O. B. Frothingham, Thomas Hill, E. C. Stedman, and W. C. Wilkinson. Anything like a complete enumeration of the writers who have gained distinction in the wide field of belles-lettres or magazine literature would be impossible within the limits of this article; and only those who are generally known or who may stand as representatives of their class can be mentioned. The most distinguished of all is Washington Irving, whose "Crayon Papers," published in England in 1822 under the title of "The Sketch Book," represents perhaps the author's most successful attempts in elegant literature. The "Inklings of Adventure," "Pencillings by the Way," "Letters from under a Bridge," and other piquant sketches of people and manners, by N. P. Willis; the series of discursive essays by O. W. Holmes, entitled "The Autocrat of the Breakfast Table," "The Professor at the Breakfast Table," and "The Poet at the Breakfast Table;" the "Reveries of a Bachelor," by D. G. Mitchell (Ik Marvel); the "Potiphar Papers," by G. W. Curtis; "Meister Karl's Sketch Book," by C. G. Leland; and the "Fern Leaves" of Mrs. Parton, are popular examples of what has been accomplished by other authors. To these names may be added those of John Sanderson, G. W. Bethune, M. M. Noah, N. Biddle, Mrs. C. Gilman, T. S. Fay, R. M. Charlton, J. J. Jarves, A. K. Gardner, A. B. Alcott, C. F. Hoffman, E. S. Gould, E. Sanford, G. H. Calvert, L. L. Noble, Park Benjamin, W. G. and L. G. Clark, E. A. Poe, Mrs. Kirkland, Theodore Sedgwick, H. W. Herbert, H. B. Wallace, C. W. Webber, G. W. Peck, W. E. Burton, Robert Turnbull, J. L. Motley, Miss Susan Fenimore Cooper, Mrs. Botta, Epes Sargent, H. D. Thoreau (whose writings, showing much acute and original observation of nature as well as great eccentricity of character in the author, have become remarkably popular since his death), Thomas Starr King, W. R. Alger, E. H. Chapin, Samuel Osgood, H. W. Bellows, Parke Godwin, C. A. Bristed ("Carl Benson"), J. G. Holland ("Timothy Titcomb"), R. G. White, J. Milton Mackie, T. W. Higginson, D. H. Strother, C. F. Briggs, E. E. Hale, G. D. Prentice, George Sumner, Miss Mary Abigail Dodge ("Gail Hamilton"), John Burroughs, Fitzhugh Ludlow, Charles T. Congdon, C. E. Norton, and Theodore Winthrop. Among the works illustrating English literature are the lectures on Shakespeare by R. H. Dana and H. N. Hudson, and the editions of the poet by G. C. Verplanck, H. N. Hudson, R. G. White, and, latest of all, the great variorum edition by Horace Howard Furness, the publication of which began in 1871; the edition of Spenser by G. S. Hillard; editions of Wordsworth and Gray by Henry Reed, of Milton by C. D. Cleveland, and of Coleridge by W. G. T. Shedd; the elaborate series of British poets by F. J. Child, assisted by J. R. Lowell and others; and various writings by R. H. Dana, A. H. Everett, J. R. Lowell, J. S. Hart, E. P. Whipple, and R. W. Emerson. Translations from the German metaphysicians, historians, and theologians have been made by George Bancroft, S. M. Fuller, G. H. Calvert, W. H. Channing, F. H. Hedge, Samuel Osgood, W. T. Harris, and George S. Morris, and by Philip Schaff and others in the American edition of Lange's commentary; and from educational and scientific authors as well as writers of fiction in Germany and France, by a variety of hands. Among the most successful of the translators from the French are Miss Mary L. Booth and Mrs. M. H. Robinson. The department of oratory and political science, though relatively less prominent than in the preceding period, occupies an important place in contemporaneous American literature; and the speeches and writings of Daniel Webster (1782–1852), Henry Clay (1777–1852), and J. C. Calhoun (1782–1850), considered merely as literary productions, are among the intellectual triumphs of the country. For dignity of expression, breadth and force of thought, and a style strong, simple, and sometimes grand, the forensic arguments and public and political speeches of Webster may rank with the masterpieces of oratory in any language. The spontaneous, impassioned eloquence of Clay, on the other hand, depended so much for its effect upon the voice and manner of the speaker, that his reputation will be mostly traditional. His published speeches give little indication of the mastery of the feelings for which he was almost unrivalled. Calhoun's eloquence was plain, strong, concise, and only occasionally impassioned; and his power, as Webster has observed, "consisted in the plainness of his propositions, the closeness of his logic, and in the earnestness and energy of his manner." To the political orators and statesmen of this period belong also John Quincy Adams (1769-1848), remarkable for the universality of his knowledge and his independence of judgment; John Randolph of Roanoke (1773–1833), an eccentric but powerful and pointed speaker, and a master of invective; Albert Gallatin (1761–1849); R. Y. Hayne (1791–1840), the eloquent antagonist of Webster; De Witt Clinton (1769–1828), Tristam Burges (1770–1853), George McDuffie (1788–1851), Silas Wright (1795–1847), H. S. Legaré (1797–1843), W. C. Preston (1794–1860), S. S. Prentiss (1808–'50), T. H. Benton (1782–1858, whose "Thirty Years' View" and "Abridgment of the Debates in Congress" afford invaluable materials to the historian of national politics), A. H. Everett (1792–1847), J. R. Poinsett (1779–1851), Lewis Cass (1782–1866), Levi Woodbury (1789–1851), Caleb Cushing (born 1800), John Sergeant (1779–1852), J. J. Crittenden (1787–1863), W. H. Seward (1801–'72), J. H. Hammond (1807–'64), R. C. Winthrop (1809), H. A. Wise (1806), S. A. Douglas (1813–'61), and R. M. T. Hunter (1809). The most accomplished orator of the period with respect to rhetorical finish and elocution was Edward Everett (1794–1865), whose productions, including his oration on Washington, which was delivered before public assemblies in many parts of the country, are thoroughly American in tone, and possess a permanent and intrinsic worth. Rufus Choate (1799–1859), in his forensic arguments and occasional public addresses, exhibited not less rhetorical excellence and more fervor than Everett; and Charles Sumner (1811–'74) excelled in strength and clearness of statement, ripe scholarship, and nobility of diction. Among the anti-slavery orators, to which class Mr. Sumner properly belonged, were William Lloyd Garrison (born 1804), whose popular addresses were singularly effective; Wendell Phillips (1811), a vigorous and impulsive speaker, frequently rising to a strain of impassioned eloquence; J. R. Giddings (1795–1864), Theodore D. Weld (1803), Theodore Parker (1810–'60), Henry Ward Beecher (1813), R. W. Emerson, Frederick Douglass (1817), Anson Burlingame (1820–'70), and G. B. Cheever (1807), whose oratory in general exhibits similar characteristics. The list of occasional orators, in addition to the names of most of the foregoing, includes those of Joseph Story (1779–1845), James Kent (1763–1847), G. C. Verplanck (1786–1870), Horace Binney (1780–1875), T. S. Grimke (1786–1834), Orville Dewey (1794), Horace Bushnell (1802–'76), E. H. Chapin (1814), H. B. Bascom (1796–1850), G. S. Hillard (1808), H. W. Bellows (1814), R. H. Dana, jr. (1815), and many others. The political writers comprise William Sullivan (1774–1839), Mathew Carey (1760–1839), J. T. Buckingham, Martin Van Buren (1782–1862), W. L. Marcy (1786–1857), Thomas Ritchie, Joseph Gales, Robert Walsh, William Leggett (1802–'39), Amos Kendall (1789–1869), Calvin Colton, J. H. Hammond, Nathan Hale, David Hale, Richard Hildreth, Joshua Leavitt, Morton McMichael, Hamilton Pleasants, T. R. R. Cobb, G. D. Prentice, W. C. Bryant, J. G. Palfrey, Robert Barnwell Rhett, Joseph Chandler, James Gordon Bennett, J. D. B. De Bow, John Fletcher, George Fitzhugh, J. L. O'Sullivan, Edwin Croswell, Thurlow Weed, Horace Greeley, J. W. Forney, W. L. Garrison, N. P. Rogers, C. C. Hazewell, John Bigelow, Parke Godwin, H. J. Raymond, E. L. Godkin, N. Paschall, B. Gratz Brown, C. H. Ray, James Brooks, Erastus Brooks, Charles Nordhoff, Charles T. Congdon, and many others. Under this head also come the comprehensive "Commentaries on the Constitution of the United States," by Justice Story, the lectures on the same subject by W. A. Duer (1780–1858), and the "Constitutional History of the United States," by G. T. Curtis. The most eminent writers on political economy are H. C. Carey (born 1793), whose "Principles of Political Economy," "Credit System in France, England, and the United States," "The Past, the Present, and the Future," and numerous other works, maintain protection doctrines in a clear, terse style; President Francis Wayland (1796–1865) and Henry Vethake, both advocates of free trade, who have published valuable text books on the subject; Francis Lieber, A. H. Everett, William Leggett, Beverley Tucker, Albert Gallatin, John Bristed, Calvin Colton, Condy Raguet, Stephen Colwell, Francis Bowen, Alonzo Potter, E. C. Seaman, E. Peshine Smith, George Opdyke, W. M. Gouge, William Maclure, Edward Atkinson, and W. G. Sumner. The writers on social science and ethics comprise Francis Lieber, author of treatises on "Liberty and Self-Government" and "Political Ethics;" G. H. Calvert, T. Sedgwick, Adam Gurowski, Bishop J. H. Hopkins, and E. Mulford, who have discussed the subject generally. W. L. Garrison, Richard Hildreth, T. D. Weld, William Goodell, Lydia M. Child, H. R. Helper, M. D. Conway, E. M. Stearns, T. Stringfellow, G. Fitzhugh, A. T. Bledsoe, J. H. Hammond, Nehemiah Adams, J. H. Hopkins, Henry Wilson, and others have written on the institution of slavery; W. P. Foulke, L. Dwight, J. S. Gould, and Miss Dorothea L. Dix, on prison discipline and kindred topics; and Charles Francis Adams, jr., and his brother Henry Brooks Adams, on the management of railroads.—In no department has the intellectual development of the country been more conspicuous than in that of jurisprudence, and the treatises, digests, and reports emanating from American authors and jurists already fill several thousand volumes, and form a valuable addition to legal literature. The "Commentaries on American Law," by James Kent, published in 1826–'30, are written with great clearness and force of reasoning, and constitute the chief manual of general reference and elementary instruction. Of the numerous works of Justice Story, those on equity jurisprudence, partnership, bailments, and "The Conflict of Laws," are well known everywhere; the "Elements of International Law" and "History of the Law of Nations," by Henry Wheaton, have become standard works of reference throughout the world; and the treatises of Edward Livingston on penal law, of Simon Greenleaf on evidence, of Willard Phillips on insurance, of F. Wharton on criminal law and other subjects, besides many by David Hoffman, St. George Tucker, J. K. Angell, John Bouvier, G. T. Curtis, L. S. Cushing, W. A. and John Duer, F. Hilliard, Murray Hoffman, Theophilus Parsons, Theodore Sedgwick, W. W. Story, I. F. Redfield, J. P. Bishop, T. M. Cooley, B. V. and Austin Abbott, A. M. Burrill, Charles Edwards, Isaac Edwards, Alfred Conkling, W. B. Lawrence, J. N. Taylor, John Townshend, R. H. Tyler, Emory Washburn, R. H. Dana, jr., Theodore D. Woolsey, and others, are creditable to the legal learning of the country.—The theological and religious writers of the period comprise a numerous and able body, whose works have in many instances become standard authorities on the subjects of which they treat, and, in view of the multiplicity of sects from which they emanate, express unusually broad and catholic views. In the department of Biblical criticism American theologians are everywhere honorably distinguished. Of Presbyterian writers, the most eminent are Samuel Davies (1724–'61); Samuel Miller (1769–1850), author, among other works, of several treatises on the distinguishing features of Presbyterianism; Edward Robinson (1794–1863), best known by his researches in Biblical geography; Albert Barnes (1798–1870), whose "Notes on the Gospels" and commentaries on other portions of Scripture are widely known in America and England; Nicholas Murray ("Kirwan," 1803–'61), author of several controversial publications; Ashbel Green (1762–1848), Gardiner Spring (1785–1873), Charles Hodge (born 1797), James Richards (1793–1843), R. J. Breckenridge (1800–'71), Archibald, J. W., and Joseph A. Alexander, T. H. Skinner, I. S. Spencer, William Adams, Thomas Smyth, Robert Baird, J. H. Thornwell (1811–'62), and Henry B. Smith. The Trinitarian Congregationalists are represented by Moses Stuart (1780–1852), author of various Scriptural commentaries, and distinguished as a philologist; Leonard Woods (1798–1854), Horace Bushnell, Edwards A. Park, Lyman Beecher (1775–1863), Edward Beecher, Henry Ward Beecher, N. W. Taylor, Bennet Tyler, E. N. Kirk, Nehemiah Adams, Mark Hopkins, Nathan Lord, Joel Hawes, Leonard Bacon, G. B. Cheever, J. P. Thompson, T. C. Upham, J. Torrey, W. G. T. Shedd, H. M. Dexter, and George Punchard, author of a "History of Congregationalism," &c. About the commencement of this period a memorable controversy took place in New England between Samuel Worcester, representing the conservative or orthodox Congregationalists, and W. E. Channing in behalf of the Unitarians, who thenceforth became an independent and, in proportion to their numbers, an important sect. The writings of Channing had great influence in moulding the opinions now generally held by Unitarians in the United States and Great Britain; and contemporary with him was a body of divines and scholars of considerable literary culture, resident chiefly in Boston and its vicinity, whose education was acquired at Harvard college, where a large proportion of the Unitarian clergy have since graduated. Prominent among these were Andrews Norton (1786–1853), author of a treatise on the "Genuineness of the Gospels;" Henry Ware, jr., and William Ware, J. G. Palfrey, Jared Sparks, N. L. Frothingham, James Walker, Orville Dewey, F. W. P. Greenwood, W. H. Furness, and G. W. Burnap. Of somewhat later date are A. P. Peabody, F. H. Hedge, G. E. Ellis, H. W. Bellows, A. A. Livermore, E. H. Sears, A. B. Muzzey, J. F. Clarke, and Samuel Osgood, afterward an Episcopalian. Distinguished from these is a rationalistic school of Unitarianism, chiefly represented by Theodore Parker (1810–'60), whose writings evince extensive scholarship and furnish frequent examples of rhetorical beauty and force. O. B. Frothingham, C. A. Bartol, John Weiss, and M. D. Conway are the most conspicuous of his successors of the same school. The principal writers of the Protestant Episcopal denomination are Bishop C. P. McIlvaine, author of a treatise on the "Evidences of Christianity;" Bishop T. C. Brownell, author of commentaries on the "Book of Common Prayer;" Bishops Alonzo Potter, George Burgess, J. M. Wainwright, J. H. Hopkins, A. C. Coxe, and W. I. Kip; S. F. Jarvis, S. H. Tyng, F. L. Hawks, J. S. Stone, F. D. Huntingdon, S. H. Turner, G. T. Bedell, R. A. Hallam, T. W. Coit, Calvin Colton, A. H. Vinton, J. A. Spencer, and

Samuel Seabury. Among the Baptists, the most noted are President Francis Wayland, William Hague, H. B. Hackett, H. J. Ripley, Pharcellus Church, Baron Stow, Alvah Hovey, W. R. Williams, T. J. Conant, J. Belcher, R. Turnbull, Richard Fuller, and J. B. Jeter; and among the Methodists, Nathan Bangs, P. D. Gorrie, John and Robert Emory, Stephen Olin, H. B. Bascom, D. D. Whedon, J. McClintock, James Strong, George Peck, Abel Stevens, W. P. Strickland, D. Curry, James Floy, D. Wise, Osmyn Baker, T. H. Stockton, E. O. Haven, C. F. Deems, H. N. McTyeire, T. O. Summers, and Alexander Green. The Roman Catholics are represented by Archbishops F. P. and P. R. Kenrick and John Hughes, the last two chiefly distinguished as controversial writers, Bishops J. England and H. Spaulding, I. T. Hecker, and O. A. Brownson, who has written several of his most noticeable review articles on theological subjects. Among the Swedenborgians, the prominent names are George Bush, author of a treatise on the "Doctrine of the Resurrection of the Body" and numerous commentaries and miscellaneous writings; Henry James, author of "The Secret of Swedenborg" and other works; Theophilus Parsons, author of "Deus Homo," "The Finite and the Infinite," and several volumes of essays; Chauncey Giles, author of several works on the future life; B. F. Barrett, Sampson Reed, and Richard De Charms. Philip Schaff, J. W. Nevin, and H. Harbaugh are the chief writers of the German Reformed, S. S. Schmucker and C. P. Krauth, of the Lutheran church; Hosea Ballou, E. H. Chapin, T. Whittemore, and T. B. Thayer, of the Universalist denomination; and T. Evans and S. M. Janney, of the society of Friends. Many of the above, including Brownson, Parker, Walker, and Wayland, have written on moral philosophy and metaphysics. The school of Locke is represented by Francis Bowen, Frederick Beasley, and others; while Parker, Walker, James Marsh, and Emerson have borrowed more or less from the German idealists and the French eclectics. C. S. Henry and O. W. Wight have made the philosophy of Cousin familiar to American readers; J. Marsh has expounded the doctrines of Coleridge; and Samuel Tyler has produced, in his "Discourse on the Baconian Philosophy," one of the most profound metaphysical disquisitions of the century. Other contributors to this department are Herman Hooker, Hubbard Winslow, Joseph Haven, H. P. Tappan, Asa Mahan, T. C. Upham, Rowland Hazard, Henry James, W. G. T. Shedd, B. F. Cocker, J. Bascom, W. D. Wilson, L. P. Hickok (whose writings on the higher branches of philosophy are among the ablest specimens of profound discussion), Noah Porter, J. McCosh, and Mark Hopkins.—Under the head of philology may be mentioned the two great English dictionaries by Noah Webster (1758–1843) and Joseph E. Worcester (1784–1865), which have superseded all others in popular use in the United States; the "Lectures on the English Language" and other works by G. P. Marsh; the "Dictionary of Americanisms," by J. R. Bartlett; and the writings of Goold Brown, W. C. Fowler, and others who have devoted themselves particularly to the structure and etymology of the English language. The aboriginal languages of North America have been treated by John Pickering, Albert Gallatin, H. R. Schoolcraft, P. E. Duponceau, E. G. Squier, W. W. Turner, Mrs. M. H. Eastman, and J. Hammond Trumbull; and grammars and vocabularies of the most important dialects have been prepared by missionaries and others specially interested in the subject. In oriental literature the investigations of American philologists have been of great value; and to American scholars, and particularly missionaries, Europe is largely indebted for its knowledge of a number of the languages of eastern Asia, Africa, and the Pacific islands. Among those who have gained eminence by their contributions to Biblical philology are Edward Robinson and Tayler Lewis, both also distinguished as Greek scholars, Moses Stuart, S. H. Turner, J. W. Gibbs, B. B. Edwards, G. R. Noyes, George Bush, T. J. Conant, and H. B. Hackett. In other branches of oriental philology the chief works are the "Burmese Dictionary," by Adoniram Judson; the English and Chinese vocabularies of S. Wells Williams; the "Notes on Chinese Literature," by A. Wiley; the Japanese dictionary of J. C. Hepburn; the Karen grammar and dictionary by F. Mason; the Hebrew grammar by W. H. Green; and the "Lectures on Language" and other works of W. D. Whitney, who is distinguished for varied and profound learning; besides the writings of W. W. Turner, E. E. Salisbury, J. G. Palfrey, E. Riggs, W. W. Greenough, and Charles Kraitsir, several of whom have contributed important papers to the "Journal of the American Oriental Society." Francis A. March, in his "Anglo-Saxon Grammar" and other works, has given important aid to the philological study of English. Among miscellaneous philological writers are C. A. Goodrich, Prof. Schele de Vere, and Horatio Hale, author of the "Ethnography and Philology of the United States Exploring Expedition" under the command of Capt. Wilkes.—The contributions to ethnology comprise some of the most costly works which have yet appeared from the American press. Among these may be enumerated the "Crania Americana," "Crania Ægyptiaca," and other works by S. G. Morton (1799–1851); the "Biblical and Physical History of Man," by J. C. Nott (1804–'73); the elaborate "Types of Mankind" and "Indigenous Races of the Earth," both profusely illustrated, by J. C. Nott and G. R. Gliddon; the "Diversity of Origin of Human Races," by Louis Agassiz (1807–'74); the "Doctrine of the Origin of the Human Race," by John Bachman; the "Progress of Ethnology," by

J. R. Bartlett; the "Races of Men and their Geographical Distribution," by Charles Pickering; "Races of the Old World," by C. L. Brace; and other works by Arnold Guyot, F. W. Redfield, T. Smyth, and A. Meigs. Intimately connected with this department are the works illustrating the origin and antiquities of the aboriginal tribes of America, the most important of which are the elaborate series by H. R. Schoolcraft, and more particularly his "Historical and Statistical Information" previously mentioned; the "American Antiquities and Researches into the Origin of the Red Race," by A. W. Bradford; the "Ancient Monuments of the Mississippi Valley," by E. G. Squier and E. H. Davis; the "Aboriginal Monuments of the State of New York," and the "Serpent Symbol," by E. G. Squier; "Prehistoric Races of the United States," by J. W. Foster; "The Native Races of the Pacific States," by H. H. Bancroft, a work of great research and erudition, and almost of an exhaustive character; "The Myths of the New World," by D. G. Brinton; "Ancient America," by J. D. Baldwin, author also of "Prehistoric Nations;" and various writings by Albert Gallatin, J. L. Stephens, W. W. Turner, G. Catlin, and others.—The number of works devoted to travel and exploration is vastly in excess of that of either of the preceding periods. Among those illustrating European travel and scenery are "Pleasant Memories of Pleasant Lands," by Mrs. Sigourney; "The Old World and the New," by Orville Dewey; "Letters from Abroad," by Miss Sedgwick; "A Year in Spain" and "Spain Revisited," by A. S. Mackenzie; "Pencillings by the Way," by N. P. Willis; "The Pilgrim in the Shadow of Mont Blanc," by G. B. Cheever; "Six Months in Italy," by G. S. Hillard; "Views Afoot" and other works by Bayard Taylor (born 1825), one of the most active and entertaining of modern travellers; "Sunny Memories of Foreign Lands," by Mrs. Stowe; "Hungary in 1851," "Home Life in Germany," and "The Norse Folk," by C. L. Brace; and many by Benjamin Silliman, W. C. Bryant, William Ware, Caleb Cushing, H. T. Cheever, J. T. Headley, Calvin Colton, Pliny Miles, S. I. Prime, Horace Greeley, H. T. Tuckerman, J. A. Dix, S. S. Cox, Mrs. Kemble, Mrs. Octavia W. Le Vert, Miss A. C. Johnson, and others. The most noticeable books upon Asia and Africa are the two series of "Biblical Researches in the Holy Land," by Edward Robinson; "Travels in Egypt, Arabia Petræa, and the Holy Land," by J. L. Stephens; "The Land and the Book," by W. H. Thomson; "The Pathways and Abiding Places of Our Lord," by J. M. Wainwright; "Nile Notes of a Howadji" and "The Howadji in Syria," by G. W. Curtis; "Boat Life in Egypt and Nubia" and "Tent Life in the Holy Land," by W. C. Prime; "Yusef," by J. Ross Browne; "The Middle Kingdom," by S. Wells Williams; "Domestic Life of the Chinese," by Justus Doolittle; "W. H. Seward's Travels round the World;" Pumpelly's "Across America and Asia;" Henry M. Stanley's "How I found Livingstone;" and H. J. Van Lennep's "Pictures of Bible Lands;" besides others by Bayard Taylor, W. Colton, Horatio Southgate, Stephen Olin, S. I. Prime, R. B. Minturn, and Frank Vincent, jr. Among books of maritime adventure or travel are W. S. W. Ruschenberger's "Voyage round the World" and "Three Years in the Pacific;" R. H. Dana, jr.'s "Two Years before the Mast;" Walter Colton's "Deck and Port," and other works; H. T. Cheever's "Island World of the Pacific;" H. A. Wise's "Los Gringos;" Herman Melville's "Redburn" and "White Jacket;" and Charles Nordhoff's "Man-of-War Life," and other highly graphic narratives of a similar character. Of works relating to the United States, the most important are Irving's "Astoria" and "Tour on the Prairies," which in point of style and interest are not inferior to anything he wrote; Timothy Flint's "Residence and Wanderings in the Valley of the Mississippi;" the various narratives of travel on the upper Mississippi by Schoolcraft; Bayard Taylor's "El Dorado;" the accurate and graphic "Journey in the Seaboard Slave States," "Journey through Texas," and "Journey in the Back Country," by F. L. Olmsted; "Picturesque America," a richly illustrated work, edited by W. C. Bryant; and many by George Catlin, G. W. Kendall, J. T. Headley, T. B. Thorpe, Horace Greeley, C. W. Webber, Sidney Andrews, and others. The geography and antiquities of Central America have been elaborately described by J. L. Stephens in his "Travels in Central America" and "Incidents of Travel in Yucatan;" by E. G. Squier in his "Nicaragua" and "Notes on Central America;" and by B. M. Norman in his "Ruined Cities of Yucatan." Among other works relating to the American hemisphere are F. F. Holton's "New Granada;" C. S. Stewart's "Brazil and La Plata;" Thomas Ewbank's "Life in Brazil;" "Brazil and the Brazilians," by D. P. Kidder and J. C. Fletcher; John Bigelow's "Jamaica in 1850;" R. B. Kimball's "Letters from Cuba" and "Cuba and the Cubans;" W. H. Hurlbert's "Gan Eden, or Pictures of Cuba;" R. H. Dana, jr.'s "To Cuba and Back;" F. S. Cozzens's "Acadia;" Agassiz's "Journey in Brazil;" C. F. Hartt's "Geology and Physical Geography of Brazil;" and James Orton's "The Andes and Amazon." A peculiar and important class of books of travel has resulted from the explorations undertaken at various times by the United States government, with a view of adding to the general stock of geographical knowledge, or of developing the resources of its own territory. The most elaborate of these is the "Narrative of the United States Exploring Expedition around the World," by Capt. Charles Wilkes, in five volumes; and of not less importance to the cause of geographical science are the narratives of exploration among the Rocky mountains and in Oregon and California by J. C. Fremont; the reports of expeditions to the Red river of Louisiana, by Capt. R. B. Marcy; to Texas and New Mexico, by J. R. Bartlett; to Utah, by Capt. Howard Stansbury; to Arizona and the Gila river, by Lieut. Col. W. H. Emory; to the southern hemisphere, by Lieut. J. M. Gilliss; to Japan, by Commodore M. C. Perry; to the Rio de la Plata, by Lieut. T. S. Page; to the Amazon, by Lieuts. W. L. Herndon and L. Gibbon; to the Dead sea, by Lieut. W. F. Lynch; and the reports of the various expeditions for the survey of railroad routes to the Pacific. The chief arctic explorers are Elisha Kent Kane (1820–'57), whose narratives of the two Grinnell expeditions in search of Sir John Franklin are among the most interesting works of their class yet produced; I. I. Hayes, author of "An Arctic Boat Journey," "The Open Polar Sea," and other works; and C. F. Hall, author of "Arctic Researches," whose melancholy fate is recorded in the "Arctic Experiences of Capt. G. E. Tyson," edited by E. V. Blake.—The wide field of natural history has been explored during this period with results highly creditable to the sagacity and industry of American men of science. The most important work in this department is the "Birds of America," by John James Audubon (1780–1851), remarkable for the vivacity of its descriptive passages and its splendid illustrations. American zoölogy has been further treated by Charles Lucien Bonaparte, Thomas Nuttall, J. P. Giraud, John Cassin, S. F. Baird, T. M. Brewer, and Elliott Coues, who have written on ornithology; by D. H. Storer, S. L. Mitchill, J. E. De Kay, and Le Sueur, on ichthyology; by Louis Agassiz, whose publications on comparative embryology, ichthyology, the geographical distribution of animals, and analogous subjects, are of the highest order of merit; by J. E. Holbrook, author of the most complete work on North American herpetology yet published; by Thomas Say, T. M. Harris, A. S. Packard, C. V. Riley, and J. L. Le Conte, who have written on entomology; and by Zadoc Thompson, A. A. Gould, B. S. Barton, T. A. Conrad, J. D. Dana, Isaac Lea, Jeffries Wyman, J. Bachman, J. E. De Kay, J. D. Godman, V. G. Audubon, S. Kneeland, A. E. Verrill, E. S. Morse, A. Agassiz, and others, who have illustrated various branches of the subject. The most eminent writers on botany are Asa Gray, author of several valuable elementary works and manuals; John Torrey, who prepared, sometimes in conjunction with Gray, the botanical reports of most of the United States exploring expeditions; Amos Eaton, Stephen Elliott, C. S. Rafinesque, Thomas Nuttall, W. Darlington, A. B. Strong, Jacob Bigelow, D. J. Browne, Alphonso Wood, W. S. Sullivant, and George Thurber; on geology, President Edward Hitchcock, William Maclure, W. B. and H. D. Rogers, J. G. Percival, Ebenezer Emmons, T. Sterry Hunt, C. T. Jackson, D. D. Owen, J. D. Whitney, A. Winchell, F. V. Hayden, J. P. Lesley, C. F. Hartt, Clarence King, J. W. Foster, W. C. Redfield, C. H. Hitchcock, J. S. Newberry, James Hall, Joseph Leidy, H. C. Lea, W. W. Mather, O. C. Marsh, and C. D. Cope, of whom the last seven are also distinguished as palæontologists; and on mineralogy, Prof. J. D. Dana, author of several works on both geology and mineralogy, J. Ross Browne, P. Cleaveland, L. C. Beck, and C. U. Shepard. The writers on chemistry include Benjamin Silliman and Benjamin Silliman, jr., Robert Hare, C. T. Jackson, J. W. Draper, Joseph Henry, E. N. Horsford, John Torrey, E. L. Youmans, Campbell Morfit, and J. P. Cooke, jr. In other branches of natural science the most noted names are M. F. Maury, author of the "Physical Geography of the Sea" and other works, W. C. Redfield, J. P. Espy, and John Brocklesby, distinguished as meteorologists; J. W. Bailey, an eminent microscopist; A. D. Bache, for many years superintendent of the United States coast survey; Joseph Henry, who has made important discoveries in electro-magnetism; Samuel Forry and Lorin Blodget, climatologists; A. M. Mayer, distinguished for researches in acoustics; and S. C. Walker, B. A. Gould, G. P. Bond, O. M. Mitchel, Denison Olmsted, J. M. Gilliss, Hannah M. Peterson, Maria Mitchell, W. A. Norton, Elias Loomis, Joseph Winlock, D. Kirkwood, Simon Newcomb, C. H. F. Peters, J. C. Watson, T. H. Safford, S. P. Langley, and C. A. Young, distinguished chiefly as astronomers. The most eminent mathematician whom the country has yet produced is Nathaniel Bowditch (1773–1838), author of a translation, with a commentary, of Laplace's *Mécanique céleste*, and of the well known "Practical Navigator," now in almost universal use. Other writers on mathematics are Benjamin Peirce, Charles Davies, C. H. Davis, and Thomas Hill. Many of the above named have been contributors to the reports and publications of the Smithsonian institution, or have participated in the scientific labors of the United States exploring expeditions and similar undertakings. —Of the numerous works on medicine and surgery produced during this period, it will suffice to mention the "Treatise on the Practice of Medicine," by G. B. Wood; "Dispensatory of the United States," by G. B. Wood and F. Bache; "Elements of Medical Jurisprudence," by J. B. and T. Romeyn Beck; "Elements of Pathological Anatomy," by S. D. Gross; "Materia Medica and Therapeutics," by J. Eberle; "The Principles of Surgery," by W. Gibson; "The Elements of Medicine," by S. H. Dickson; "The Institutes of Medicine," by Martyn Paine; the treatises on "Midwifery" and "Diseases of Females," by W. P. Dewees; the treatise on "Obstetrics," by C. D. Meigs; the "Human Physiology" and "Dictionary of Medical Science," by R. Dunglison; "American Medical Botany" and "Nature in Disease," by Jacob Bigelow; "Letters to a

Young Physician," by James Jackson; "Surgical Observations on Tumors," by J. C. Warren; the treatises on "Human Physiology" by J. W. Draper and by J. C. Dalton; the "Treatise on the Principles and Practice of Medicine," by Austin Flint; "The Physiology of Man," by Austin Flint, jr.; and the various works of W. A. Hammond; besides which there are many of reputation by D. Hosack, J. W. Francis, S. G. Morton, S. Forry, J. Bell, P. Earle, O. W. Holmes, G. S. Bedford, Horace Green, C. A. Harris, W. E. Horner, P. S. Physick, C. Wistar, Valentine Mott, J. Pancoast, L. V. Bell, W. W. Sanger, A. Brigham, L. M. Lawson, S. W. Mitchell, T. D. Mütter, Bennet Dowler, J. A. Swett, Daniel Drake, Charles Caldwell, H. H. Smith, E. Parrish, J. King, A. Stillé, Winslow Lewis, G. Hayward, J. M. Smith, P. Townsend, W. W. Gerhard, J. R. Cox, P. F. Eve, S. F. Condie, and W. H. Van Buren. The principal writers of the homœopathic school are C. Hering, E. E. Marcy, J. H. Pulte, C. J. Hempel, Egbert Guernsey, and W. H. Holcombe.—The theory of education has occupied a large share of the attention of American writers during this period; and among many valuable works on the subject may be mentioned the "Lectures on Education," by Horace Mann (1796–1859); "National Education in Europe," by Henry Barnard; "The Theory and Practice of Teaching," by D. P. Page; "The Student's Manual," by John Todd; "University Education," by Chancellor H. P. Tappan; "The School and Schoolmaster," by Bishop Alonzo Potter and G. B. Emerson; besides others by F. A. P. Barnard, William Russell, Barnas Sears, G. F. Thayer, W. A. Alcott, W. C. Woodbridge, Hubbard Winslow, A. B. Alcott, W. H. McGuffey, J. S. Hart, and S. G. Howe. Under this head may also be included the "Five Years in an English University," by C. A. Bristed; "German Universities," by J. M. Hart (also treated in J. F. Hurst's "Five Years' Residence in Germany"); and "American Colleges" and other works by Noah Porter. The general excellence and enormous production of school books are perhaps the most remarkable features of American literature. Among these are the Greek lexicons of J. Pickering and H. Drisler; the Latin lexicons of F. P. Leverett and E. A. Andrews; the Latin and Greek grammars and elementary books of Andrews, C. C. Felton, Charles Anthon, J. McClintock, A. C. Kendrick, J. Hadley, J. R. Boise, A. Crosby, A. Harkness, E. A. Sophocles, P. Bullions, and S. H. Taylor; and the editions of classical authors by President T. D. Woolsey, Anthon, Felton, H. S. Frieze, T. A. Thacher, Tayler Lewis, J. J. Owen, J. L. Lincoln, C. S. Wheeler, and C. K. Dillaway. English grammar and composition have been treated by Samuel Kirkham, Goold Brown, J. Greenleaf, P. Bullions, W. H. Wells, Allan Weld, R. G. Parker, G. P. Quackenbos, William Swinton, and others; and the spelling books of Noah Webster, C. W. Sanders, and S. Town have had a prodigious circulation. The chief writers of mathematical text books are Daniel Adams, Warren Colburn, C. W. Hackley, C. Davies, W. G. Peck, E. Loomis, G. R. Perkins, T. Sherwin, B. Greenleaf, F. Emerson, D. Leach, W. M. Gillespie, W. D. Swan, and J. F. Stoddard; and of school geographies, atlases, etc., W. C. Woodbridge, Mrs. Emma Willard, Jesse Olney, J. E. Worcester, R. C. Smith, S. A. Mitchell, F. McNally, Arnold Guyot, Miss S. S. Cornell, and William Swinton.—Among works on the science of war may be mentioned those on military tactics by Lieut. Gen. Winfield Scott (1786–1866) and W. J. Hardee; A. Mordecai's "Artillery for the United States Land Service;" D. H. Mahan's works on engineering, fortifications, &c.; H. W. Halleck's "Elements of Military Art and Science;" J. A. Dahlgren's "System of Boat Armament" and "Shells and Shell Guns;" C. B. Stuart's "Naval Dry Docks of the United States;" J. G. Barnard's "Notes on Sea-coast Defence;" J. H. Ward's "Elementary Course of Instruction in Ordnance and Naval Gunnery;" De Hart's "Constitution and Practice of Courts Martial;" Col. H. L. Scott's "Dictionary of Military Science;" Upton's "New System of Infantry Tactics;" besides many by J. G. and B. J. Totten, E. L. Viele, W. N. Jeffers, jr., H. D. Grafton, J. G. Benton, Hermann Haupt, A. L. Holley, S. V. Benét, H. D. Wallen, A. J. Meyer, E. C. Boynton, and others.—Comparatively few authors have written on the fine arts; the most prominent are W. Dunlap, author of a "History of the Arts of Design in America;" J. J. Jarves, author of "Art Hints" and "Art Thoughts;" Washington Allston, Horatio Greenough, H. T. Tuckerman, B. J. Lossing, W. H. Fry, Mrs. H. F. Lee, Thomas Hastings, W. M. Hunt, and Lowell Mason, who have written upon sculpture, painting, and music. Rural architecture and landscape gardening have been illustrated by A. J. Downing (1815–'52) in a number of gracefully written treatises and essays; and Samuel Sloan, C. Vaux, G. Wheeler, T. W. Walter, R. Upjohn, M. Field, and others have published general works on architecture. Of the numerous works produced on agricultural and horticultural subjects may be cited "European Agriculture and Rural Economy," by H. Colman; the "Farmer's Companion" and "Farmer's Instructor," by Jesse Buel; E. Ruffin's "Calcareous Manures;" R. L. Allen's "American Herd Book" and "New American Farm Book;" R. Buist's "American Flower Garden Directory;" Downing's "Fruit and Fruit Trees of America;" "The Fruit Garden," by P. Barry; "The Fruit Trees of America," by C. M. Hovey; "The Muck Manual," by S. L. Dana; H. S. Randall's "Sheep Husbandry;" L. T. Smith's "American Farmer's Hand-Book;" G. E. Waring's "Elements of Agriculture;" J. J. Thomas's "Farm Implements and Machinery;" besides many valuable publications by J. S. Skinner, C. L. Flint, J. J. Mapes, S. W. Johnson, D. J. Browne, T. Bridgman, W. Gaylord, L. Tucker, G. H. Dodd, J. Harris, H. S. Olcott, and others. The useful manuals of Mrs. Hale, Miss C. E. Beecher, Miss Leslie, and Mrs. Terhune represent the contributions to domestic economy. J. R. Snowden and W. C. Prime are the principal writers on numismatics; E. Jarvis, L. Shattuck, J. Chickering, J. D. B. De Bow, and F. A. Walker represent the statisticians; James Renwick and Thomas Ewbank the writers on mechanics; H. W. Herbert has a unique reputation as a writer on field sports in America; and C. E. Lester has been a prolific miscellaneous author. Among the miscellaneous literature of the period may be classed the numerous volumes of "Collections" and "Memoirs" illustrating the national history, published by the historical societies of the several states, particularly by those of Massachusetts, New York, and Pennsylvania. The "Archæologia Americana," or transactions of the American antiquarian society, form also a valuable contribution to the archæological literature of the country. Lastly, the foundations of American bibliography have been laid by the valuable works of Isaiah Thomas, O. A. Roorbach, G. P. Putnam, Nicholas Trübner, H. E. Ludewig, H. Ternaux, H. Stevens, O. Rich, E. B. O'Callaghan, F. Leypoldt, and Joseph Sabin. (See NEWSPAPERS, and PERIODICALS.)

UNIVERSALISTS, a religious denomination, holding the final destruction of evil, and the restoration of all souls through Jesus Christ. The following statement probably represents the belief of the great majority of Universalists of the present day. I. OF GOD. They believe that God is infinite in all his perfections, creating man with the fixed purpose that the existence he was about to bestow should prove a final and everlasting blessing; that, foreseeing all the temptations, transgressions, and struggles of man, he shaped his government, laws, and penalties with express reference to these emergencies, and adapted the spiritual forces to the final overcoming of all evil; that being almighty, he can convert and save a world of sinners as easily as he converted and saved Saul of Tarsus or Matthew the publican, and without any more violation of "free agency" in the one case than in the other. They also believe in the perfection of the divine justice; and affirm, on this ground, that God would not impose on finite beings a law infinite in its demands and penalties; but that, being perfectly just, he will deal with every man according to his works, whether good or bad. II. OF CHRIST. They uniformly reject the doctrine of the Trinity, making Christ subordinate to the Father. They believe that he is gifted with spirit and power above all other intelligences; that he is "God manifest in the flesh," *i. e.*, that God has displayed in him the brightness of his glory and the express image of his person, as in no other being tabernacled in flesh; that he was sent of God to be the Saviour of the world, and that he will actually save it, because God would not offer, nor would Christ accept, a mission which both knew would end in failure; therefore, they say, the work of redemption will be thorough and universal. III. OF MAN. They believe that Adam was created upright, but liable to sin; that all men are formed, as Adam was, in the moral image of God; and that this image, though it may be disfigured by sin, can never be wholly lost. Faith and regeneration remove the stains and defilements of sin, and renew or reform the soul in the divine likeness. IV. OF REGENERATION. They believe the new birth to be that thorough change of heart which takes place when a man, wrought upon by divine truth and grace, forsakes his sins, or turns from his former life of worldliness and indifference toward God and the Saviour, and is drawn into fellowship with the Holy Spirit, and, thus quickened into new spiritual vitality, consecrates himself to a life of active goodness and piety. This new birth is not supernatural, but the result of appointed means suitably improved. The Holy Spirit blesses the use of these means, and moves upon the heart of the sinner, encouraging, comforting, assisting, sanctifying. They do not believe in instantaneous regeneration, though they teach that there may be a turning point in the life of every man, when his attention is specially directed to religion. Conversion is only the commencement of religious effort. V. OF SALVATION. They teach that salvation is not shelter nor safety, nor escape from present or future punishment. It is inward and spiritual, and not from any outward evil, but deliverance from error, unbelief, sin, the tyranny of the flesh and its hurtful lusts, into the liberty and blessedness of a holy life, and supreme love to God and man. This is an important doctrinal and practical point with Universalists, and is constantly enforced in their preaching and writings. They urge on all to seek salvation, not from the torments of a future hell, but from the present captivity of sin. In reply to the objection that millions die in sin, in pagan ignorance and unbelief, they answer that no one is wholly saved in this life, but that all men are saved, in a greater or less degree, after death; and assert that the power of Christ over the soul does not cease with the death of the body, but that he continues the work of enlightenment and redemption till he surrenders the kingdom to the Father, which does not take place till after the resurrection is complete. VI. OF THE RESURRECTION. The resurrection is not merely a physical but a moral and spiritual change. It is not only clothing the soul with an incorruptible body, but it is an *anastasis*, a raising up, an exaltation of the whole being into the power and glory of the heavenly; for, "as we have borne the image of the earthy, we shall also bear the image of the heavenly." It is a change, they say, by which we become as the angels, and "are children of God, being (or, because we are) children of the resurrection." It must, therefore, be something more than clothing the soul in a spiritual body. It is, besides this, growth in spiritual strength and power, in knowledge, in holiness, in all the elements and forces of the divine life, until we reach a point of perfectness and blessedness described by the term heaven. This resurrection, or lifting up of the soul into the glorified life of the angels, is the work of the Lord Jesus Christ. The end of his mediatorial reign, the completion of his saving work, and the final surrender of his kingdom back to God, does not take place till after this anastasis, or till this uplifting of all the dead and living into "the image of the heavenly" is completed. VII. Of Rewards and Punishments. On the subject of rewards and punishments, the Universalist belief is substantially, that holiness, piety, love of God and man, are their own reward, make their own heaven here and hereafter; and that in the nature of things no other reward is possible. If men love God with all their hearts, and trust in him, they find, and are satisfied with, the present heaven which love and faith bring with them. They hold the same doctrine respecting punishment: that it is consequential, not arbitrary—the natural fruit of sin; that it is for restraint, correction, and discipline; and that God loves as truly when he punishes as when he blesses, never inflicting pain in anger, but only because he sees that it is needed to prevent a greater evil. They affirm that the law is made for the good of man, and that of course the penalty cannot be such as to defeat the object of the law. Transgression brings misery or punishment, which is designed to correct and restore to obedience, because obedience is happiness. They maintain that pain ordained for its own sake, and perpetuated to all eternity, is proof of infinite malignity; but God, they say, is infinitely beneficent, and therefore all suffering must have a beneficent element in it, all punishment must be temporary and end in good.—The Universalists believe that traces of their main doctrine may be found in the earliest Christian writings. Some of the Gnostic sects held to the final purification of those who died in sin, as the Basilidians, Valentinians, &c. The famous Christian collection known as "Sibylline Oracles" teaches explicitly the doctrine of the final restoration of the lost. As this work was written expressly to convert the pagans to Christianity, Universalists affirm that this is conclusive as to what was regarded as Christian doctrine on this point in the earliest period of Christianity. They profess to find the same belief taught in the writings of Clement of Alexandria, Origen, Marcellus of Ancyra, Titus of Bostra, Gregory of Nyssa, Didymus the Blind of Alexandria, Diodorus of Tarsus, Theodore of Mopsuestia, and Fabius Marius Victorinus (A. D. 200–400). Notwithstanding that Universalism, as such, was specially and formally condemned by a council, that of Mennas, held in Constantinople, A. D. 544, the doctrine survived, and occasionally appeared in strength; as among the Albigenses and Waldenses in the 12th century, the Lollards of Germany in the 14th, the "Men of Understanding" in the 15th, and some of the Anabaptist sects in the 16th. When the reformation began in England, this doctrine rose with it, and was defended with such zeal and success that, in preparing the "Articles of Faith" for the national church, it was thought necessary to introduce a special condemnation in an article which afterward, when the forty-two articles were revised and reduced to thirty-nine, was omitted. Some of the most eminent members of this church have sanctioned the doctrine: Archbishop Tillotson, Dr. Burnet in his *De Statu Mortuorum*, Bishop Newton, Dr. Henry Moore, William Whiston, David Hartley in his "Observations on Man," and others. Among others who believed and defended it were Soame Jenyns, Jeremy White, chaplain to Oliver Cromwell and author of "The Restoration of All Things," and William Law, author of the "Serious Call" and "Christian Perfection." The English Unitarians generally believe the doctrine; and it is held by numbers in the established church, and positively taught in their writings, as in those of Charles Kingsley, Stopford Brooke, and George Macdonald. The doctrine prevails extensively in Germany. It is freely accepted also in the liberal branch of the French Protestant church. Universalism began to attract attention in America about the middle of the 18th century, and since the arrival of the Rev. John Murray in 1770 it has spread with great rapidity. The denominational "Register" for 1876 gives a United States convention, composed of 22 state conventions, in their turn composed of 73 associations, representing 689 ministers, 867 parishes owning 623 church edifices, and having 628 Sunday schools with a membership of 58,000. The church property is estimated at over $7,500,000 above all liabilities. They have established and supported 5 colleges, 2 theological schools, 7 academies, and 13 periodicals. There are also various state missionary, Sunday school, and tract societies. The woman's centenary association alone distributed nearly a quarter of a million tracts in 1875. The Universalist publishing house at Boston, denominational property, owns the title, copyright, and plates of 125 volumes, and issues five periodicals. The Murray centenary fund, established in 1869 as a memorial of the first century of Universalism in America, devoted to the education of young men for the ministry, the circulation of denominational literature, and church extension, amounted in 1875 to $120,700. Tufts college, at Medford, Mass., opened in 1854, has now a property of over $1,000,000; St. Lawrence university, Canton, N. Y., $255,000; Buchtel college, Akron, Ohio, $300,000; and

Dean academy, Franklin, Mass., $350,000. Relief funds, in aid of aged and needy clergymen and their families, amount to $47,000. The ecclesiastical government of the denomination is representative and congregational, the United States convention being the final court of appeal in all cases of fellowship and discipline. —See Ballou's "Ancient Universalism" (edition of 1872), Whittemore's "Modern Universalism" (1830), Thayer's "Theology of Universalism," &c.

UNIVERSITY (Lat. *universitas*), a corporation, consisting of the teachers or students, or teachers and students, of an educational institution, empowered to confer degrees in one or more faculties. The word *universitas* denoted primarily an aggregate of persons or things; in its secondary sense it was used to designate a society or corporation, but without necessarily any reference to education. Thus there were in Rome universities of priests, musicians, bakers, &c. In the beginning of the middle ages institutions of learning were called *schola*, *studium*, or *studium generale*, and afterward *universitas magistrorum*, *doctorum*, or *scholarium*. The university of Paris was a corporation of teachers, that of Bologna of students, while Salamanca partook of both characteristics. The remainder of the Italian and nearly all of the French universities were also associations of students, but the English and German universities were modelled after that of Paris.—The modern university, which had no exact counterpart in the ancient academies, had its origin in the schools which grew up around the monasteries and cathedrals of Europe. These began about the 6th century, and took the place of the Roman imperial schools which had fallen with the irruptions of the barbarians, but previous to the reign of Charlemagne they were of little importance. That emperor called around him learned men from all countries, and established cathedral and conventual schools in his principal cities; under his successors these became centres of learning, in which was taught all the erudition of the age. The fame of some successful teacher in any of these schools attracted thither other lecturers and many students, who in time formed unions or associations for mutual benefit, and thus laid the foundations of the universities. The oldest of these, the university of Paris, owed its early celebrity to the teachings of William of Champeaux, who taught logic in Paris in 1109, and of Abélard, his pupil and rival. Peter Lombard, a student of Bologna and afterward of Paris, taught theology there in the same century, and added to its reputation; and it is said that its students in 1150 exceeded the citizens in number. These were connected with many different schools, some of which were appendages of the churches and monasteries in and around Paris, and some private schools gathered around noted lecturers. Toward the end of the 12th century all were formed into a corporate body by Philip Augustus, but it does not appear that the term university was applied to it before the beginning of the 13th century. It is probable that it had formed several organizations previous to this consolidation; for the students of the arts and sciences were divided as early as 1169 into four provinces or nations: the French nation, including, besides French, natives of Spain, Italy, and Greece; the Picard, students from N. E. France and the Netherlands; the Norman, those from W. France; and the English (called German after 1430), those from England, Ireland, Scotland, and Germany. Each nation was governed by a procurator. The university comprised at first but two faculties, that of arts and sciences, and that of theology; law and medicine were added in the 13th century. Each faculty, excepting that of arts and sciences, had at its head a dean, and the three deans and the four procurators constituted a council, in which, under the presidency of the rector, who was elective, was vested the government of the university. The power of conferring degrees belonged to the chancellor alone. There were two chancellors, one appointed by the bishop of Paris, and one by the abbot of Ste. Geneviève, in whose lands were situated a part of the university buildings; the former, who took precedence, was chancellor of the three higher faculties, the latter of the faculty of arts. Academic degrees were conferred as early as the middle of the 12th century, and probably before, but their origin is unknown. At first the degree of master was synonymous with that of doctor, and was conferred on those who were competent to teach; but afterward the former was confined to those who taught the arts, and the latter to those who gave instruction in theology, law, or medicine. Bachelors were those who had passed through the curriculum of study, which required three and a half years; after a second equal period of study and the passing of the requisite examinations, they became masters and were qualified to teach the seven liberal arts within the limits of the university. Pope Nicholas I. gave the university the power of endowing its graduates with the privilege of teaching everywhere. For the doctor's degree in divinity nine years' additional study was required. As many of the thousands of students who annually flocked to Paris were poor, colleges were early established by individuals and by religious orders, where at first free board and lodging only were dispensed; but many of them finally became places of instruction also. Toward the close of the 15th century there were 18 large colleges belonging to the faculty of arts, and 80 smaller ones. At this time nearly all students belonged to some of the colleges. Those who were unattached to any were called *martinets*. (See College.) The university of Paris was endowed with extraordinary privileges, and was so powerful that it sometimes resisted even the royal authority. It did not acknowledge the jurisdiction of ordinary judges, but had its own courts and its representatives in the states general. During the wars of the league it lost its political importance, and in 1793, by a decree of the convention, it was suppressed. Napoleon I., by the law of 1806 and the decrees of 1808 and 1811, established a national organization embracing all public instruction under the name of the university of France, at the head of which was a grand master assisted by a university council. This comprised several sections called academies, each embracing several departments, and each governed by a rector assisted by an academical council. This great institution monopolized all higher instruction until 1875, when the law permitting the establishment of universities independent of the state was passed. But the university of France is still maintained, and in 1875 had subordinate to it 16 academies, with the following centres: Aix, Besançon, Bordeaux, Caen, Chambéry, Clermont, Dijon, Douai, Grenoble, Lyons, Montpellier, Nancy, Paris, Poitiers, Rennes, and Toulouse. A complete academy, like that of Paris, has the five faculties of theology, law, medicine, science, and letters; but most of the other provincial centres have only three or four faculties. The academy of Paris has a very large corps of professors and usually from 7,000 to 8,000 students. The provincial academies average about 1,500 students. The university of France, which alone has the power to confer degrees, is now under the direct control of the minister of education. A new Roman Catholic university was projected in Paris in 1875. The other universities of France, all of which were suppressed with that of Paris in 1793, and some of which were afterward reëstablished as academies, were as follows: Montpellier, celebrated as a medical school, founded in 1176; Toulouse, famous as a school of law, 1228; Angers, 1246; Lyons, 1290; Orleans, 1309; Grenoble, 1339, removed to Valence in 1452; Avignon and Perpignan, 1340; Orange, 1365; Aix, 1409; Dôle, 1422, removed to Besançon in 1676; Poitiers, 1431; Caen, 1433; Bordeaux, 1441; Valence, 1452; Nantes, 1463; Bourges, 1463; Rheims, 1547; Douai, 1568; Besançon, 1676; Pau and Dijon, 1722; Nancy, 1769.—Of nearly equal antiquity with the university of Paris is that of Bologna, which attained fame as a law school under Irnerius early in the 12th century. Some writers have endeavored to connect it with a school established there in the 5th century by Theodosius II. and revived by Charlemagne, but it had no claim to be called a university before the 12th century. A similar claim of the university of Pavia to have been founded by Charlemagne in 774 rests on no better foundation. Bologna was granted a charter of privileges in 1158 by Frederick Barbarossa. The students were divided into two universities, *citramontani* or natives of Italy, and *ultramontani* or foreigners, the former divided into 17 and the latter into 18 nations. Each nation had a presiding officer called a counsellor, except the German, which had instead two procurators. Toward the close of the 12th century rectors were chosen, one for each university, by the combined votes of the counsellors and of electors chosen from the university at large. For a long time the students of arts and of medicine were enrolled in the university of law, and it was not till 1316 that their right to form a separate university was acknowledged. A university of theology was established in 1362, the members of which were all doctors, the students being enrolled among the scholars of art. Degrees were conferred at Bologna at a very early period. The first teachers were called *dominus*, *magister*, *causidicus*, and *judex*. Eight years' study was required for the degree of doctor of civil law, and six years' for that of canon law. These degrees were conferred upon learned men and women alike, and the latter were even permitted to hold professorships until a late period. Fixed salaries were paid to professors at Bologna as early as the 13th century, and in the 17th century the city expended annually about 40,000 crowns in salaries. The university of Salerno was as celebrated in medicine as that of Paris in theology and science, and that of Bologna in law. It attained its greatest fame in the 12th century, although it existed as a school several centuries earlier. Students were obliged to study logic for three years in this university before beginning the study of medicine, which occupied them five years longer, and they were not then admitted to a degree until they had practised for a year under a skilled physician. As at Bologna, women as well as men were admitted to the privileges of the university, and in the 11th, 12th, and 13th centuries several of its female graduates were noted as physicians and as writers of medical treatises. (See MEDICINE, vol. xi., p. 348.) Of the present Italian universities, those classified in the accompanying table are royal universities, maintained by the government. In these the faculty of theology has been abolished by act of parliament, and women are admitted as students in all the faculties. The university of Rome is known as the Collegio della Sapienza. Four other universities, Camerino (founded in 1727), Perugia (1307), Ferrara (1321), and Urbino (1671), are maintained by their respective provinces. The following universities, some of which were once flourishing institutions, no longer exist: Vicenza (founded 1204), Arezzo (1215), Vercelli (1228), Piacenza (1248), Cremona (1413), Florence (1438), Milan (1565), and Mantua (1625).—Next after Paris and Bologna, the universities of Oxford and Cambridge became celebrated. About 1200 the great French and Italian schools were largely resorted to by English students; but by the middle of the 13th century Oxford was second only to Paris in the number of its students and the brilliancy of its scholarship. Its students were never divided into nations, but were governed as one body under a chancellor. In the 13th century three colleges were established, and in the 14th these were increased to seven, and most of the students were enrolled in one or the other of them. The government of Cambridge was similar to that of Oxford, and colleges were established there about the same period. (See CAMBRIDGE, UNIVERSITY OF, and OXFORD, UNIVERSITY OF.) The two other English universities, Durham and London, were founded in 1833 and 1836 respectively. The former owes its origin to an effort begun in 1649 and carried into effect in 1657, when letters patent were granted by Cromwell for its establishment, the buildings belonging to the deans and prebendaries of Durham cathedral being set apart for its use. But the restoration put an end to the project, and it was not revived till 1831; in 1832 an act of parliament permitted the appropriation of certain property belonging to the cathedral for the use of the university, which was opened the following year, and in 1837 it was incorporated and granted all the rights and privileges incident to universities created by royal charter. It now has one college, called University college, and two halls, Bishop Hatfield's, founded in 1846, and Bishop Cousin's, founded in 1851. Its general regulations for education are similar to those of Oxford and Cambridge. The university of London was created in 1836 by royal charter, the provisions of which have been several times enlarged and modified. It confers its degrees, with a few exceptions, upon persons educated in any part of the British dominions who can satisfactorily pass its examinations. Unlike the other universities, it has no colleges immediately connected with it, but has affiliated to it nearly all the institutions of learning in the British empire, including Oxford, Cambridge, and Durham, and the Scottish and Irish universities, to the students of all of which its honors are open for competition. No degrees are conferred in course or *pro causa honoris*, but strict examinations are required before each degree. This institution has accomplished much good in rendering education freer from form and routine, and yet more thorough. All the English universities excepting that of London formerly required a declaration of membership in the established church as a qualification for graduation; but by the universities' test act of 1871, no student at Oxford, Cambridge, or Durham is now obliged to subscribe any profession of faith for any degree, or for the exercise of any right of graduates, excepting in divinity.—The universities of Scotland originally differed somewhat from those of England. The students were divided, as in the continental universities, into four nations, named respectively Fife, Angus, Albany, and Lothian, and the colleges were the places of residence of the teachers and not of the students. St. Andrews had from its foundation in 1411 faculties of arts, divinity, and canon law; it now consists of two colleges, one of the arts, called the united college of St. Salvator (founded in 1456) and St. Leonard (1512), which were consolidated in 1747, and the divinity college of St. Mary's, founded in 1537. The united college has professors of medicine and chemistry, but the university has no faculties of law and medicine. The university of Glasgow, founded in 1451, was empowered from the beginning to teach theology, civil and canon law, and the arts, but only the faculty of arts was fully organized until after the reformation. It now contains the four usual faculties. The students, who reside without the college walls, are divided into four nations, Glottiana (comprising those from Lanarkshire), Transforthana (Scotland north of the Forth), Rothseiana (Buteshire, Renfrewshire, and Ayrshire), and Londoniana (all other places). The university of Aberdeen was founded in 1494, by a bull of Pope Alexander VI., which granted to it all the immunities and privileges enjoyed by Paris and Bologna. In 1505 a college was founded by Bishop Elphinstone, which was subsequently named King's college. This constituted the entire university till 1593, when Marischal college was founded by George Keith, earl marischal. These two foundations were united by Charles I. under the name of King Charles's university of Aberdeen, but the union seems not to have been recognized, and they retained their character of distinct colleges till 1858, when they were finally incorporated in the present university. King's college now comprises the faculties of arts and divinity, and Marischal those of law and medicine. The students are divided into four nations, Mar, Buchan, Moray, and Angus. The university of Edinburgh, established in 1582 by King James VI., is a single college with the powers of a university. It originally had but one class under a single regent or teacher, but in the beginning of the 17th century it comprised a principal and four regents. Chairs of theology and medicine were instituted in 1642 and 1685 respectively, but there was no faculty of law until the beginning of the 18th century. It was under the direct control of the city corporation till 1858, when a uniform constitution was given to all the Scottish universities by the university act. By this statute each has now three governing bodies, a *senatus academicus*, university court, and general council. The senatus academicus has charge of the instruction and discipline, and of the property and revenues of the university; the university court reviews the decisions of the former body, and regulates the internal affairs of the university; and the general council, a deliberative body, discusses any questions affecting the university, but, having no legislative power, refers them to the university court. The chief officers of each university are a chancellor elected by the general council, a vice chancellor appointed by the chancellor, and a rector elected by the matriculated students. The rectorship is an honorary office, usually conferred upon distinguished non-residents. The degrees conferred on examination are master of arts, bachelor of divinity, of laws, and of medicine, master of surgery, and doctor of medicine; the honorary degrees are doctor of divinity and doctor of laws. Edinburgh grants, besides these, the degrees of bachelor and doctor of science. Bachelor of arts is not now conferred in any of the Scottish universities.—A university was established in Dublin in connection with St. Patrick's cathedral in 1320, by a bull of Pope John XXII., but it was never prosperous. The present university of Dublin was founded in 1591 by Archbishop Loftus, and chartered in the following year by Queen Elizabeth as the college of the holy and undivided Trinity. This, the only college, has all the powers of a university. Its government is vested in a chancellor, a vice chancellor, a provost, a vice provost, and two proctors. The staff of professors is very full, including, in addition to the ordinary faculties, chairs of the oriental and modern languages and mining and civil engineering. The students are divided into four grades: 1, noblemen, sons of noblemen, and baronets, the two first of whom are granted the degree of bachelor of arts *per specialem gratiam;* 2, fellow commoners, who receive the same degree with one examination less than the pensioners; 3, pensioners, who comprise the great body of the students; 4, sizars, who are exempted from annual fees and have their commons free. The sizars are limited to 30, and are selected by competitive examination. Each grade of students wears a distinctive dress. Queen's university consists of three colleges, situated in Belfast, Cork, and Galway respectively, and each called Queen's college. Each college forms a corporate body managed by a council, consisting of the president, vice president, and the four deans of faculty. The university government is vested in a chancellor, vice chancellor, and a senate composed of 20 persons, three of whom are the presidents of the colleges. The seat of the university is in Dublin, the meetings of the senate being usually held in Dublin castle. The Roman Catholic university of Dublin, founded in 1854, has several affiliated colleges.—The Arabs established schools at an early period in Spain, of which those at Cordova, Granada, and Malaga were celebrated before the revival of learning in Christian Europe, but they had little in common with the modern university. The first Spanish university was founded at Palencia in the latter part of the 12th century by Alfonso VIII. of Castile. About 1200 Alfonso IX. of Leon established the university of Salamanca, with which that of Palencia was united in 1239. It received its first endowment in 1254 from Alfonso X., but the country was in so unsettled a state that there was little encouragement for letters, and by 1310 the university had fallen greatly into decay. Spanish students resorted in large numbers to the Italian universities, and many to Paris and Oxford; but toward the close of the 14th century Salamanca became an efficient institution and was attended by upward of 10,000 students. In the 16th century it again declined, and it continued to languish until the French invasion, when most of its fine buildings were destroyed. Salamanca had 28 colleges, of which four were *colegios mayores*, and the remainder *colegios menores.* The former, which were aristocratic foundations and received only students of noble birth, were San Bartolome (1410), Santiago el Cebedeo (1506), San Salvador, and Santiago Apóstolo (1521). These were the only *colegios mayores* in Spain, excepting one at Seville and one at Valladolid, and to be a graduate of one of them was to insure future advancement. They were deprived of their privileges and remodelled in 1770 by Charles III. The *colegios menores* were attended by all students not of noble birth. Besides these there were four military colleges, which ranked with the colleges of the nobles, of the respective orders of San Juan, Santiago, Alcántara, and Calatrava. Only three of these colleges exist in the present university: Santiago Apóstolo, now *el colegio de los nobles irlandeses*, for the education of Irish students for the priesthood; San Carlos Borromeo, one of the *menores*, now the bishop's seminary; and El Carvajal, also one of the *menores*, which is still conducted on its old foundation. Salamanca was governed by a rector assisted by an academic council of which he was the head. All students and graduates were subject to the university judiciary, at the head of which was a special official, the *maestrescuela.* The university comprised schools of all grades; in the *escuelas mayores* the course embraced theology, ecclesiastical and civil law, mathematics, natural and moral philosophy, the languages, and rhetoric; in the *escuelas menores*, grammar and music; and in the *escuelas minimas*, reading, writing, and the elements of grammar. Spain has now ten universities, each of which is intended to have five faculties: philosophy and literature, mathematical and natural sciences, pharmacy, medicine, and law; but they are not all full. Theology is now taught only in the seminaries. The present condition of all the universities is shown in the accompanying table. The following are now extinct: Huesca (founded in 1354), Sigüenza (1471), Ávila (1482), Alcalá de Henares (1510, merged with Madrid in 1836), Toledo (1499), Baeza (1533), and Osuna (1548).—Portugal has but one university, Coimbra, founded at Lisbon in 1291 by Dionysius I., who transferred it to Coimbra in 1308; it was again removed to Lisbon by Alfonso IV. in 1338, and finally established at Coimbra by John III. in 1527. It now embraces 18 colleges, and has five faculties: of theology, of law, of medicine, surgery, and pharmacy, of mathematics, and of philosophy. The rector, who is nominated by the king, presides over the *concelho dos decanos*, which consists of the deans of the faculties and several other officers, and has the general government of the university. Three degrees are conferred: baccalaureate, licentiate, and doctor.—The oldest universities of central Europe, including Germany, are those of Austria, that of Prague having been founded in 1348, of Cracow in 1364, and of Vienna in 1365. The statistics of these and of the other Austro-Hungarian universities are given in the table. In their general organization they are similar to the universities of the German empire, having the four regular faculties; those of theology and philosophy bear the usual designation, but that of law includes political science, and that of medicine is called the medical and surgical faculty. The medical faculty is generally the most prominent, that in the university of Vienna being especially celebrated; but of late years the number of students of law has sometimes exceeded those of medicine. The English rather than the German system of examinations prevails. In 1872 a new university was established in Klausenburg, Transylvania, where one was founded in 1580; and in 1875 one was founded at Czernowitz. Of Austro-Hungarian universities not now existing, that of Tyrnau (founded in 1635) was removed to Buda in 1777, and finally merged in that of Pesth in 1784; that of Trieste (1454) was abolished in 1797; that of Olmütz (1581) was removed to Brünn in 1778, restored to Olmütz in 1827, and abolished in 1853; and that of Salzburg (1620) was abolished in 1810. The school of Linz is not reckoned as a university because it has less than the four faculties.—The present condition of the universities of the German empire is shown in the accompanying table. The governments have supreme control over all of these institutions, the ministers of public instruction having the immediate control; and all are dependent on state appropriations, excepting Leipsic, Heidelberg, and Greifswald, which have property of their own. The government is represented in each by a curator, who is charged with the enforcement of the official regulations and laws; by the professors; and by a quæstor, who collects and pays over the fees due from students. All these officials are appointed by the ministers of public instruction. The professors choose annually the other officers, viz.: a rector, who is the actual head of the university; a pro-rector, who acts as an assistant to the rector in the Austrian universities, but is found in the German universities only when the sovereign is nominal rector, when he performs all the duties of rector; a judge (*Universitätsrichter*) or chancellor (*Kanzler*), who assists the rector in the decision of judicial matters; and the deans (*Dekanen*) of the faculties, who preside over all questions belonging to faculty jurisdiction. The *senatus academicus*, composed of all these officers and several of the ordinary professors, is the legislative body and executive council of the university, but is seldom convened excepting in important cases, the rector and the judge who constitute the university court having jurisdiction over all ordinary matters. All the universities have the four ordinary faculties, to which some add a faculty of political economy (*staatswirthschaftliche*) and of natural science (*naturwissenschaftliche*). Each faculty regulates its own internal affairs through its professors and its dean, subject to the general regulations of the university. Each faculty includes all who teach in its department of instruction, and consists of ordinary or full professors (*ordentliche*); extraordinary professors (*ausserordentliche*), who, though inferior in rank to the ordinary professors, are not necessarily assistants or subordinates; and private lecturers (*Privatdocenten*). In the Austrian universities are also instructors (*Lehrer*) and assistants (*Assistenten*). Entrance into the German universities is to be effected only through the gymnasium, or preparatory school, excepting in the case of foreigners, who are admitted without examination. The examination at the close of the gymnasium course, which is very thorough, is called *Abiturienten-Examen* (leaving examination); the successful student receives a certificate of maturity (*Maturitätszeugniss*), which enables him to enroll himself, after paying a small matriculation fee, as a member of any of the universities, when he registers in whichever faculty he chooses. The course of study is usually four years, but in some of the universities five years are required in the medical faculty. Students are not obliged to remain at one university, but can study at several without loss of standing; they board and lodge where they please, and enjoy much social liberty. Dismission from one university is no bar to entrance at another, but expulsion (*Relegation*) from one is expulsion from all. The principal degree conferred in each faculty is the doctorate, that of philosophy (Ph. D.) corresponding to the English and American A. M. To attain it, an oral examination is required, and a dissertation written in German or Latin. The tendency of the present system of university education in Germany is shown by the great decrease of the number of students in the theological faculties. The Prussian universities (exclusive of those in the territories annexed in 1866), which in 1831 had 2,203 theological students, had but 740 in 1873; Marburg, which had 124 in 1831, had but 46 in 1873; and Giessen, which had 80 in 1850, had only 10 in 1873. The following is a list of German universities which are now extinct, with the dates of their foundation and abolition: Cologne, 1388–1801; Erfurt, 1392–1816; Ingolstadt, 1472, removed to Landshut in 1800, and thence to Munich in 1826; Mentz, 1477–1798; Wittenberg, 1502, merged with Halle in 1815; Frankfort-on-the-Oder, 1506, merged with Breslau in 1810; Dillingen, 1549–1804; Helmstedt, 1575–1809; Herborn, 1584–1817; Paderborn, 1614-1819; Rinteln, 1621–

1809; Altdorf, 1622, merged in 1809 with Erlangen; Münster, 1631, merged in 1818 with Bonn; Osnabrück, 1632–1650; Bamberg, 1648–1803; Duisburg, 1655–1804; Fulda, 1734–1805; Stuttgart, 1781–1794.—The Swiss universities are like the German in almost every respect, but are local rather than national, each being supported by the canton in which it is situated. Instruction is given altogether in the German language, and most of the professors are graduates of German institutions. Their standard is scarcely second rate. Basel, the oldest, was founded in 1460. There were 32 female students at Bern in 1875, and 33 at Zürich.—The universities of Holland are also modelled after those of Germany, but have five faculties, that of philosophy being divided into letters and theoretical philosophy. Instruction is given in great part in the Latin language, and the professors are nearly all ordinary professors. The university of Leyden, founded by William of Orange, became in the 17th century one of the most famous institutions of learning in Europe, and it still retains its high character for scholarship. In 1873 the states general voted 1,300,000 florins for the erection of new buildings and additions to the cabinet collections. The university of Franeker, founded in 1585, was suppressed by Napoleon in 1811. Of the Belgian universities, Louvain, founded about 1425, is the oldest and the most celebrated. In the 16th century it ranked as one of the first institutions of learning in Europe, its students numbered more than 6,000, and it possessed 43 colleges, some of which were munificently endowed. It was suppressed by the French in 1797, reëstablished in 1817 by the Dutch government, again abolished by the Belgian government in 1834, and in 1835 revived as a free Roman Catholic university under the control of the bishops. It now has five faculties: theology, law, medicine, letters and philosophy, and sciences. The universities of Ghent and Liége are state institutions, and each receives from the government 350,000 francs per annum. Each contains four faculties, and Ghent has in addition a school of engineering and Liége a school of mines. They are like the German universities in their general organization, but the examinations for degrees are conducted at Brussels, by a board appointed by the king. The degrees are *candidat* and doctor in each of the faculties. The university of Brussels, founded in 1834 by the liberal party as a rival of Louvain, is free from sectarian bias. It comprises faculties of philosophy, natural science, jurisprudence, and medicine, and a pharmaceutical school. It is controlled by a council of administration, composed of the rector, secretary, and treasurer of the university, with the burgomaster of the city as president. The degree of doctor in any of the faculties is conferred only on those who have been members of the university one year and have received the degree of *candidat*.—The oldest of the Scandinavian universities is that of Upsal in Sweden, founded in 1477 by the regent Sten Sturé. The faculties and teachers are the same as in the German universities, but its general organization is modelled after the mediæval institutions. The students are divided into nations according to the different provinces to which they belong, each nation having a building and officers of its own. The chancellor, pro-chancellor, professors, rector, &c., are all appointed by the king. The rector, who has immediate supervision, is appointed every year. The university of Lund is similar in all respects to that of Upsal, but has never reached its great reputation. The government is about to found a new free university in Stockholm. The university of Christiania, in Norway, is the youngest of the Scandinavian institutions. It is essentially German in organization and government, and has the usual four faculties. The university of Copenhagen, founded in 1478, is the only one now possessed by Denmark, since that of Kiel has been transferred to Germany. It has five faculties: theology, medicine, jurisprudence and political science, philosophy, and mathematical and natural sciences. A rector, chosen yearly, is the executive officer, and its general organization is like that of the German universities.—The Russian universities also are formed on the German model, and many of the professors are German; but only one, Dorpat, has a theological faculty, and the faculty of philosophy is usually divided into a historico-philological and a physico-mathematical faculty. At Kazan there is a division of oriental languages, which is said to be the most complete in the world. Dorpat is noted for its physico-mathematical faculty. The university of Moscow, the oldest established by the Russian government, has a very large and able corps of professors. The Polish university of Warsaw, founded in 1816, was suppressed in 1832, and reëstablished under Russian auspices in 1869. That of Wilna, founded in 1579, and also suppressed in 1832, has not been revived. The Alexander university of Helsingfors, which was removed from Åbo after the burning of its buildings in 1827, still retains much of its former character before it came under Russian influence, and is one of the most progressive institutions in the empire. It has a chancellor, nominally the emperor, but who is represented by the minister for Finland, a vice chancellor, a rector, and a pro-rector. All the Russian universities are sustained mostly by the government. In 1875 a new university was about to be established at Tomsk in Siberia.—The university of Athens was established in 1837, by subscriptions raised mostly from Greeks resident in foreign countries. It is under the supervision of the minister of instruction, but is presided over directly by a rector or vice chancellor. There are four full faculties and a school of pharmacy, and the general system resembles that in the German universities. The university of Corfu, established by the earl of Guilford in 1823, has been suppressed since the union of the Ionian islands with Greece.—A university was established in 1870 in Constantinople, with faculties of literature, law, and the natural sciences and mathematics. It is superintended by a rector, and each faculty has a dean. Roumania has two universities, at Bucharest and Jassy respectively. In Servia the academy of Belgrade was in 1869 erected into a university, which in 1874 had 16 professors and 229 students. The university of Cairo (El-Ashar) is the principal Mohammedan place of education in the East. The instruction includes grammar, arithmetic, algebra, logic, philosophy, and theology and law according to the four sects of the Sunnis. It has more than 300 teachers, and the number of students generally exceeds 9,000. The university of Valetta, Malta, founded in 1838, has faculties of theology, law, medicine, and arts.—The Chinese have a national university (*Kwoh-tsz' Kien*) at Peking, but little is known of its condition. Only the sons of officers of high rank are admitted to its courses, where they are educated at the expense of the government for particular service. The new scheme of education adopted in Japan provides for eight universities, but not all have yet been established. The imperial university in Tokio had in 1875 nearly 100 foreign professors.—India has three universities, at Calcutta, Bombay, and Madras, with each of which are affiliated several colleges. The university of Calcutta has usually from 800 to 1,000 students, and those of Bombay and Madras about 500 each. They are all government institutions. Australia has already three universities, those of Sydney (1852), Melbourne (1854), and Adelaide (1874); and New Zealand has one at Dunedin (1871).—The principal universities of the United States are described in this work in special articles, excepting when the name of the institution coincides with that of the place in which it is situated, when it is treated under that title. (See also COLLEGE, where they are included in the table, and EDUCATION.) The Johns Hopkins university, formally inaugurated in Baltimore on Feb. 22, 1876, will be conducted on the German system. It has an annual income, from the endowment of its founder, of $200,000. The principal Canadian universities are McGill university, in Montreal, founded in 1811, and the university of Toronto in Toronto, founded in 1827. Laval university, a Roman Catholic institution in Quebec, was established in 1852. There are also several other denominational colleges called universities, which are noticed in the articles on the several Canadian provinces.—Most of the South American countries have universities, but few of them have attained eminence. The Argentine Republic has two, at Buenos Ayres and Córdoba. The university of Chili, at Santiago, was founded in 1842, to take the place of that of San Felipe, founded in 1783. It has faculties of law, medicine, pharmacy, and physical and mathematical sciences, and a school of art. Bolivia has three universities, at Sucre, La Paz, and Cochabamba, each of which has faculties of theology, law, medicine, mathematics and physics, and philosophy. They confer degrees of bachelor, licentiate, and doctor in all the faculties excepting medicine, in which only that of doctor is given. Brazil has excellent colleges in Rio de Janeiro, embracing all the faculties, but no established university. There are six universities in Peru, at Lima, Arequipa, Puno, Cuzco, Ayacucho, and Trujillo. Only that of Lima, which is the oldest in America, having been founded in 1551, is of consequence. Its faculties are full, and it is attended by a large number of students. Colombia has a university at Bogotá, and several inferior institutions in provincial cities. The university of Venezuela is at Carácas; it had full faculties and 19 professors in 1874. Of the Central American states, Costa Rica has a university at San José, and Nicaragua two universities, one at Leon and one at Granada. In 1874 San Salvador voted to establish a new university at San Miguel; and in 1875 the university of Guatemala, in the city of Guatemala, was reorganized on the French plan. Mexico has now no university.—In the following table the statistics of the German, Austrian, and Swiss universities are for 1874–'5, of the Italian for 1873, and of the others for years ranging from 1871 to 1875:

PLACE.	Date of establishment.	PROFESSORS.		Tutors.	Total.	Total students.
		Ord.	Ext.			
ENGLAND.						
Cambridge	1231	86	..	75	....	....
Durham	1833	6	..	3	....	....
Oxford	1149	43	..	100	....	....
SCOTLAND.						
Aberdeen	1494	21	..	..	....	....
Edinburgh	1582	37	..	..	....	1,500
Glasgow	1451	30	..	..	....	1,200
St. Andrews	1411	17	..	..	....	....
IRELAND.						
Dublin	1592	40	..	..	....	1,300
Queen's	1850	..	..	..	....	1,000
GERMANY.						
Berlin	1810	60	59	69	188	1,824
Bonn	1786	57	26	19	102	724
Breslau	1702	50	21	82	103	1,087
Erlangen	1743	34	11	8	53	414
Freiburg	1457	33	6	9	48	318
Giessen	1607	35	10	10	55	340
Göttingen	1734	56	23	30	109	991
Greifswald	1456	38	11	10	59	465
Halle	1694	47	25	21	93	989
Heidelberg	1386	39	23	36	99	534
Jena	1558	28	13	29	70	442
Kiel	1665	36	6	18	60	199
Königsberg	1544	46	9	22	77	628
Leipsic	1409	56	48	48	152	2,947
Marburg	1527	38	7	16	61	409
Munich	1826	69	10	36	115	1,101
Rostock	1419	28	3	7	38	158
Strasburg	1621	54	14	12	80	654
Tübingen	1477	44	12	24	80	827
Würzburg	1403	39	4	15	58	951

PLACE.	Date of establishment.	PROFESSORS.		Tutors.	Total.	Total students.
		Ord.	Ext.			
AUSTRIA.						
Cracow	1364	..	..	..	70	563
Gratz	1586	40	15	21	76	834
Innspruck	1672	41	11	8	60	527
Lemberg	1784	..	..	..	46	1,031
Pesth	1784	..	..	..	140	2,296
Prague	1348	57	24	33	114	1,824
Vienna	1365	76	42	109	227	3,228
SWITZERLAND.						
Basel	1460	32	14	17	63	158
Bern	1834	37	7	26	70	285
Zürich	1832	33	9	30	72	340
ITALY.						
Bologna	1158	44	7	7	58	488
Cagliari	1720	21	7	2	30	78
Catania	1445	21	5	12	38	213
Genoa	1812	25	12	9	46	336
Macerata	1290	11	9	..	20	115
Messina	1548	25	5	6	36	101
Modena	....	23	7	12	42	285
Naples	1224	52	11	10	73	....
Padua	1222	41	9	15	65	1,121
Palermo	....	35	11	10	56	216
Parma	1599	33	9	5	47	226
Pavia	....	30	9	6	45	571
Pisa	1339	39	14	13	66	332
Rome	1245	36	3	12	51	442
Sassari	1620	8	9	14	31	66
Siena	1320	16	6	10	32	89
Turin	1405	39	15	15	69	935
SPAIN.						
Barcelona	....	53	..	..	....	2,440
Granada	1531	45	..	..	....	706
Madrid	1836	84	..	..	....	5,475
Oviedo	1580	15	..	..	....	163
Salamanca	1200	45	..	..	....	266
Santiago	1504	45	..	..	....	649
Saragossa	1474	43	..	..	....	826
Seville	1502	59	..	..	....	2,252
Valencia	1410	37	..	..	....	942
Valladolid	1346	32	..	..	....	940
PORTUGAL.						
Coimbra	1291	48	..	40	....	1,500
NETHERLANDS.						
Groningen	1614	..	..	..	21	....
Leyden	1575	..	..	..	40	700
Utrecht	1636	..	..	...	23	500
BELGIUM.						
Brussels	1834	..	..	..	43	500
Ghent	1816	..	..	..	....	400
Liége	1817	..	..	..	....	500
Louvain	1426	..	..	..	....	800
DENMARK.						
Copenhagen	1478	..	..	..	....	1,200
SWEDEN.						
Lund	1668	..	..	..	63	563
Upsal	1477	..	..	..	99	1,480
NORWAY.						
Christiania	1811	..	..	..	34	978
RUSSIA.						
Dorpat	1632	37	5	22	64	811
Helsingfors	1827	33	3	25	61	475
Kazan	1814	..	..	..	76	400
Kharkov	1804	..	..	..	80	500
Kiev	1834	..	..	..	100	1,000
Moscow	1755	..	..	..	120	1,800
Odessa	1865	..	..	..	39	257
St. Petersburg	1819	..	..	..	75	1,400
Warsaw	1816	..	..	..	....	....
GREECE.						
Athens	1837	..	..	..	....	....

—See Crevier, *Histoire de l'université de Paris* (7 vols., Paris, 1761); Anthony à Wood, "History and Antiquities of the University of Oxford" (2 vols., 1792–'6); Malden, "Origin of Universities and Academic Degrees" (12mo, London, 1835); De Viriville, *Histoire des universités en France* (Paris, 1847); Bristed, "Five Years in an English University" (New York, 1852; new ed., 1874); Schaff, "Germany, its Universities," &c. (Philadelphia, 1857); Zarncke, *Die deutschen Universitäten im Mittelalter* (Leipsic, 1867); Sybel, *Die deutschen und die auswärtigen Universitäten* (Bonn, 1868); Mullinger, "The University of Cambridge from the Earliest Times to 1535" (Cambridge, 1873); and Hart, "German Universities" (New York, 1874).

UNTERWALDEN, a central canton of Switzerland, bounded N. by Lucerne and Schwytz, E. by Uri, S. by Bern, and W. by Lucerne; area, 295 sq. m.; pop. in 1870, 26,116, of whom 25,687 were Roman Catholics. It is divided into Upper and Lower Unterwalden, the capital of the former, which is the western division, being Sarnen, and that of the latter Stanz. Much of the surface is covered by mountains, which traverse the canton in different directions, and in the south attain a height of upward of 10,000 ft. above the sea. The remainder consists of four principal valleys, which have a general slope toward Lake Lucerne on the N. frontier, into which the chief rivers, the Melch and the Aa, discharge nearly all the drainage of the canton. There are several small lakes, and about one fourth of the area of Lake Lucerne belongs to Unterwalden. The geological formation is chalk, and the canton is remarkable for a great number of caverns. Little of the land is level enough for agriculture, but the pastures are excellent, and cattle constitute the chief wealth of the inhabitants. There are extensive forests. Apples, pears, and chestnuts are raised in great quantities. German is the language of the canton. The government is democratic, and every male inhabitant of 20 years and upward is entitled to vote. Unterwalden was one of the three original cantons of the Swiss confederation.

UPAS TREE, a Javan tree belonging to the breadfruit family (*artocarpeæ*), which botanists now unite with the mulberry family (*moreæ*). The native name of the tree is *bohun upas*, and its resinous and highly poisonous exudation is called *antiar*, a name used for the genus, *antiaris;* while this species (*A. toxicaria*) is poisonous, others are innocuous. The tree reaches 100 ft. or more in height, with a straight trunk and a handsome rounded head; the oblong or ovate leaves, 3 to 5 in. long, are much veined and downy; the monœcious flowers are small and inconspicuous, the pistillate being succeeded by an oval, purple drupe, in appearance like a small elongated plum. When the tree was first made known extraordinary stories were told about it on the authority of Foersch, a surgeon in the service of the Dutch East India company near the close of the 18th century; he represented that the emanations of the upas tree killed all animals that approached it, even birds that flew too near it falling dead; that criminals condemned to death were allowed as an alternative to go to that tree and collect some of the poison, only two out of 20 ever returning; and that he had learned from those fortunate enough to return that the tree was in a valley, with no other tree or plant within 10 or 12 m. of it, all being a barren waste, strewn with human and other bones; he also said that out of a population of 1,600, who were forced by a civil war to take refuge within 12 or 14 m. of the tree, only 300 were alive at the end of three months. These stories were accepted until they were disproved by Leschenault, whose memoir (*Annales du muséum d'histoire naturelle*, 1810) is translated in Hooker's "Companion to the Botanical Magazine," vol. i. So far from growing in a solitary desert, the upas is found in the forests with other trees, and lizards and other animals do not avoid it; its poisonous emanations appear to have a similar effect to those of our poison ivy and sumach, and to affect some persons and not others; several botanists have since collected specimens without unpleasant results, and living plants of upas are now in the principal botanic gardens of Europe, where they are not known to be harmful. It is supposed that the story of the valley of death had its origin in the fact that there was some locality in a volcanic country where an abundant emission of carbonic acid gas produced the fatal results ascribed to the upas tree. The poison has long been used by the natives upon their arrows and other implements of war and the chase; the basis of the poison is the juice of the tree, collected by making incisions, and with this they mix, as do the South Americans in preparing *woorara*, various other substances, which seem to be more required by tradition than for any efficacy they can add to the poison; among those mixed with the upas are the juice of the onion and garlic, cardamom, black pepper, and seeds of a capsicum. When introduced into the circulation of an animal, it acts upon the vascular system, and causes a congestion of the principal viscera, especially the lungs, and death follows in a few minutes. The natives of the same countries use another and more deadly poison, *tieute*, from a species of *strychnos*, which at once affects the nervous system and causes almost instant death. The inner bark of the upas tree affords a fibre which is spun into cloth and worn by the poorer classes as a substitute for linen; if this accidentally gets wet, it produces an intolerable itching. Another species, *A. saccidora*, of Malabar, has a bark so tough that bags for rice and other articles are made from it; the branches are cut into truncheons of the proper size, and the bark removed in such a manner as to leave a thin section of wood as a bottom to the bag.

Upas Tree (Antiaris toxicaria).

UPHAM, Charles Wentworth, an American author, born in St. John, New Brunswick, May 4, 1802, died in Salem, Mass., June 14, 1875. He graduated at Harvard college in 1821, and at the Cambridge divinity school in 1824, and was pastor of the first Unitarian church in Salem till December, 1844, when he left the ministry. He was mayor of Salem in 1852, member of congress in 1853–'5, for several years a member of the legislature, and in 1857-'8 president of the state senate. He edited the "Christian Register" in 1845–'6, and published "Letters on the Logos" (Boston, 1828); "Lectures on Witchcraft, comprising a History of the Salem Delusion, 1692" (1831; enlarged ed., 2 vols. 8vo, 1867); "Life of Sir Henry Vane" (in Sparks's "American Biography," 1835); "Prophecy as an Evidence of Christianity" (1835); "Life of J. C. Fremont" (1856); "Memoir of Francis Peabody" (1869); "Salem Witchcraft and Cotton Mather, a Reply" (1870); and vols. ii., iii., and iv. of the "Life of Timothy Pickering," begun by Octavius Pickering (1867–'72).

UPHAM, Thomas Cogswell, an American author, born in Deerfield, N. H., Jan. 30, 1799, died in New York, April 2, 1872. He graduated at Dartmouth college in 1818, and at Andover theological seminary in 1821, when he became assistant teacher of the Hebrew language. While thus engaged he prepared a translation of Jahn's "Biblical Archæology," which passed through numerous editions. In 1823 he was ordained colleague pastor of the Congregational church in Rochester, N. H.; and from 1825 to 1867 he was professor of mental and moral philosophy in Bowdoin college. Among his works are: "Ratio Disciplinæ, or the Constitution of Congregational Churches" (Portland, 1829); "Elements of Mental Philosophy" (2 vols. 12mo, 1839; abridged ed., 1864); and "Philosophical and Practical Treatise on the Will" (12mo, New York, 1850). He also wrote a series of treatises and memoirs on religious experience, approximating in sentiment to the writings of Tauler, Gerson, and other mystics of the 14th, 15th, and 16th centuries. Their titles are:

"Principles of the Interior or Hidden Life" (12mo, New York, 1848); "Life of Faith" (1848); "Treatise on Divine Union" (Boston, 1851); "Religious Maxims" (Philadelphia, 1854); "Life of Madame Catharine Adorna" (Boston, 1856); "Life and Religious Opinions of Madame Guyon, together with some Account of the Personal History and Religious Experience of Archbishop Fénelon" (2 vols. 12mo, New York, 1847); and "A Method of Prayer, an Analysis of the Work so entitled by Madame de la Mothe Guyon" (1859). Besides these, he wrote "Manual of Peace" (8vo, New York, 1836); "Outlines of Imperfect and Disordered Mental Action" (18mo, 1840); "American Cottage Life, a Series of Poems" (16mo, Portland, 1852); "Letters, Æsthetic, Social, and Moral, written from Europe, Egypt, and Palestine" (8vo, Philadelphia, 1857; new ed., 1865); and one of the essays on a congress of nations (8vo, Boston, 1840).

UPOLU. See Samoan Islands.

UPSAL, or **Upsala. I.** A län or district of Sweden, in Svealand, bordering on the gulf of Bothnia, Stockholm, Lake Mælar, Westmanland, and Gefleborg; area, 2,015 sq. m.; pop. in 1874, 102,629. The sea coast extends about 20 m., and has several small indentations and the large bay of Löftsa. The surface consists of undulating plains, and there are several lakes; the soil is fertile in the south, and the scenery beautiful, but much of the north is barren and bleak. Iron ore is extensively worked, that of Dannemora being the best. Sufficient grain is raised for local consumption, and cattle are largely exported. **II.** A city, capital of the län, on the Fyris or Sala, near its junction with the Skol, 40 m. N. N. W. of Stockholm; pop. in 1873, 12,138. It is in the largest and most fertile plain of central Sweden, and contains fine new buildings and parks. The archbishop of Upsal is primate of all Sweden. The Gothic cathedral, commenced in the latter part of the 13th century and finished in 1435, is the most celebrated of the country, though not improved by the restorations which it has undergone since the damage inflicted by the great conflagration of 1702. Among its relics are those of St. Eric in a silver shrine, the monument of Gustavus Vasa and John II., and many other tombs and monuments in the various chapels, including that of Linnæus. Trinity church in the Odin Lund park, near the cathedral, is a much older building. In the same locality is an obelisk erected in honor of Gustavus Adolphus for his rich endowment of the university. This institution was founded by Sten Sturé in 1477. In 1875 it had 1,480 students (855 in philosophy, 332 in theology, 151 in medicine, and 142 in law), with 31 professors and 68 other teachers. New university buildings are projected, the foundation stone to be laid on the fourth centennial of its foundation (1877). The university library, dating from 1621, is now in a handsome building adjoining the Carolina park, and contains 150,000 volumes and 8,000 manuscripts, including the *Codex Argenteus* of Ulfilas, the most complete copy in Europe of the old Icelandic Edda, the holy book of the Druses, and a Bible with commentations by Luther and Melanchthon. Connected with the university are large numismatic and mineralogical collections, a botanic garden (near the house of Linnæus) with a museum, and an observatory. Upsal has a gymnasium and other schools, and the Gustavian academy and other learned institutions. The greatest business activity occurs in February, when the ancient annual market is held. There is much railway and steamboat traffic with Stockholm.—About 3 m. N. is the village of Gamla Upsala (Old Upsal), the traditional capital of Odin. No vestiges remain of the temple and the sacred grove devoted to his worship, though there are numerous tumuli, of great archæological interest, and considered among the largest N. of the Alps. New excavations have recently been undertaken. In the vicinity of Upsal is the Mora meadow with the Mora stones, renowned from the practice in ancient times of electing the kings here, lifting them upon a large stone in the centre, and engraving the name of each new king, with the date of his election, on a newly deposited stone.

UPSHUR. I. A N. central county of West Virginia, bounded E. by the Middle fork of the Monongahela river, and intersected by the Buckhannon; area, about 500 sq. m.; pop. in 1870, 8,023, of whom 172 were colored. The surface is rolling and in some parts hilly. The soil of the valleys is good. The chief productions in 1870 were 29,958 bushels of wheat, 6,055 of rye, 108,494 of Indian corn, 21,422 of oats, 11,448 of potatoes, 11,190 lbs. of tobacco, 21,857 of wool, 127,158 of butter, and 7,233 tons of hay. There were 2,039 horses, 2,329 milch cows, 4,561 other cattle, 8,000 sheep, and 3,361 swine. Capital, Buckhannon. **II.** A N. E. county of Texas, bounded S. by Sabine river; area, 945 sq. m.; pop. in 1870, 12,039, of whom 4,867 were colored. The surface is nearly level and well timbered, and the soil fertile. The chief productions in 1870 were 326,681 bushels of Indian corn, 8,053 of oats, 40,806 of sweet potatoes, 51,816 lbs. of butter, 1,129 of wool, and 7,362 bales of cotton. There were 2,703 horses, 4,247 milch cows, 8,516 other cattle, 2,262 sheep, and 23,615 swine. Capital, Gilmer.

UPSON, a W. county of Georgia, bounded S. W. by Flint river; area, 384 sq. m.; pop. in 1870, 9,430, of whom 4,565 were colored. The surface is hilly and the soil generally fertile. The Upson County railroad terminates at the county seat. The chief productions in 1870 were 26,594 bushels of wheat, 168,164 of Indian corn, 9,166 of oats, 17,186 of sweet potatoes, 22,695 lbs. of butter, 5,188 of wool, and 4,835 bales of cotton. There were 510 horses, 1,047 mules and asses, 1,238 milch cows, 2,641 other cattle, 1,193 sheep, and 7,558 swine; 2 manufactories of cotton goods, and 1 of cotton yarn. Capital, Thomaston.

URAL, formerly **Yaik,** a river of Russia, forming a part of the geographical boundary between Europe and Asia. It takes its rise in the district of Troitzk, in the Asiatic portion of the government of Orenburg, in the S. part of the Ural mountains. Its source is about 1,600 ft. above the sea, and it flows at first S. past Upper Uralsk, Magnitnaya, and Kizilskaya, bends W. near Orsk, passes Orenburg, and turning S. E. flows past Uralsk, thence S., and discharges into the Caspian sea by several mouths, near Guriev, about lat. 47° N. Its length is estimated at about 1,100 m. Its principal affluents are: on the right, the Kizil, Tanalyk, and Sakmara; on the left, the Or and Ilek. In its upper portion it is obstructed by rapids, and flows through a mountainous country; lower down it passes through wide steppes or saline plains, one of which lying between this river and the Volga is called the Uralian steppe. Toward winter the river near its mouth abounds with fish. The navigation of the Ural is of very little importance. A line of forts has been erected along its shores as a defence against the Bashkirs and Kirghiz.

URAL MOUNTAINS, the chain of mountains forming the N. E. boundary of Europe, and geographically separating European Russia from Siberia, though almost all included in the administrative divisions of the former. Of very moderate height and breadth, the chain would appear insignificant but for the contrast it presents to the great regions of plains that spread from its W. flank over central Russia and from its E. side into Siberia. Its course is nearly due N. and S. over an extent, as usually estimated, of 18 or 19 degrees of latitude, with a general breadth of about 40 m. On the south it begins on the right bank of the Ural river at the Kirghiz steppe, in about lat. 51° N.; but high lands may be traced still further S. into the region lying between the lake of Aral and the Caspian sea. On the north its termination is at the gulf of Kara in the Arctic ocean, though its continuation is marked in the rocky hills on the W. side of Nova Zembla. The highest summit of this portion of the range, named Glassovskoi, is about 2,500 ft. above the sea. The average elevation of the Ural mountains is probably less than 2,000 ft. above the sea, and its highest summits do not reach 6,000 ft. Much of the range blends so gradually into the plains at its sides that it has little of the mountainous character, and is crossed by easy roads, as that by which Yekaterinburg is reached from Perm. The highest summit is Telposis, 5,537 ft.; other principal summits are Deneshkin Kamen, 5,357 ft., and Iremel, 5,038 ft. It is only in the extreme northern part that the mountains remain covered with snow during summer. In general, the chain is clothed with forests of the gigantic *pinus cembra*, above which are often picturesque ledges, frequently overgrown with pæonies, roses, and geraniums. The rocks of which these mountains are composed resemble those of the Appalachian mountains. The lower groups are Silurian strata metamorphosed into crystalline rocks, which for the most part are talcose schists, quartzites, and limestones. To these succeed the upper Silurian, Devonian, and carboniferous, the strata of which are also more or less altered, though still retaining traces of their characteristic fossils. A marked contrast is observed in the appearance of these rocks on the European and Asiatic slopes. On the former the strata are indeed contorted, fractured, and partially changed; while in the centre, as on the eastern slopes, the masses consist everywhere either of highly altered and crystalline Silurian strata, or of the eruptive rocks which penetrate them. It is in these formations, especially where the talcose and chloritic schists are traversed by veinstones of quartz or cut by dikes of igneous rocks, that gold is found. In the debris from these are situated the gold washings, which furnish the chief portion of this metal and of platinum to the Russian government. There are also important mines of iron and copper; and diamonds, emeralds, and various other precious stones are found in the same region. The most important mines are in the neighborhoods of Nizhni Tagilsk, Yekaterinburg, Berezov, Zlatoust, and Miyask.—See *Russlands Montan-Industrie, insbesondere dessen Eisenwesen, beleuchtet nach der Industrie-Ausstellung zu St. Petersburg und einer Bereisung der vorzüglichsten Hüttenwerke des Urals im Jahre* 1870, by P. von Tunner (Leipsic, 1871).

URANIA, one of the nine muses, daughter of Zeus by Mnemosyne. She was regarded as the muse of astronomy, and was usually represented with a little staff pointing at a celestial globe. Urania, "the celestial," was also an epithet of Aphrodite or Venus, as the goddess of pure love, in distinction from Pandemos.

URANIUM, a metal, the protoxide of which, supposed to be the metal itself, was discovered in 1789 by Klaproth in the mineral pitchblende, and was named by him after the planet Uranus, then lately discovered. The metal itself was not really separated until M. Péligot obtained it about 1840 by decomposing its chloride by means of potassium or sodium. Thus produced, it is partly in the form of a black powder, and in part composed of silvery laminæ which can be filed and are somewhat ductile. The metal dissolves in dilute acids, setting free hydrogen gas. Its specific gravity is 18·4. In the air it undergoes no change at common temperatures; but when the metal in the form of a powder is moderately heated, it takes fire and burns with a remarkably white and shining light. The product of this combustion is a deep green oxide. Uranium is represented by the symbol U, and its chemical equivalent is 240 (formerly 60, then 120). It forms two classes of compounds: the uranous, in which it is quadrivalent, as uranous oxide, UO_2 (oxygen being bivalent), and uranous chloride, UCl_4; and the uranic, in which it is sexvalent, as uranic oxide, UO_3, and uranic oxychloride, UO_2Cl_2. Prof. Roscoe in 1875 described a pentachloride, UCl_5. There is also a uranoso-uranic oxide, UO_2, $2UO_3$, or U_3O_8. Uranic oxide unites with basic metallic oxides, forming uranates; and there are salts of the metal uranium with iodine, bromine, and fluorine. The compounds of uranium are employed chiefly in giving yellowish hues to glass and porcelain. The peculiar yellow tint with greenish or opaline reflections seen in Bohemian glass is derived from them. Uranium glass is remarkable for exhibiting with great distinctness the phenomenon of fluorescence, and this property, together with the absorption spectra afforded by uranium salts, has been recently thoroughly investigated by President Morton of the Stevens institute, Hoboken, and Dr. H. Carrington Bolton of Columbia college, New York. (See "The American Chemist," 1873.) Uranium compounds are of great value in porcelain painting, mineral pitchblende being used to a considerable extent at Joachimsthal in Bohemia, where it is converted into uranate of soda for this purpose. It produces an orange color in the enamelling fire, and a fine black in the furnace in which the porcelain is baked. The uranate of soda is of fine orange color, and has been proposed as a paint. Uranium is found accompanying various ores of silver and lead in several of the mining districts of Bohemia, Hungary, and Saxony. It also occurs as a sulphate and carbonate. Torbernite, occurring in beautiful green crystals, is a phosphate of uranium and copper; autunite, found in yellow scales, contains phosphate of uranium and lime. Uranic arsenates of similar composition have been recently discovered. Fine specimens of uranium minerals are found near Redruth in Cornwall, and in various localities in Bohemia and Saxony.—See "Index to the Literature of Uranium," by H. Carrington Bolton, in the "Annals of the Lyceum of Natural History," New York, 1870.

URANUS, or **Cœlus** (Gr. and Lat., heaven), in classical mythology, sometimes the son and sometimes the husband of Gæa or Terra. He preceded Saturn and Jupiter on the throne of heaven. By Gæa he was the father of Oceanus, Saturn, Tethys, Themis, Mnemosyne, the Cyclops, and others. He hated his children, and immediately after their birth confined them in Tartarus; but one of them, Saturn, at the instigation of Gæa, mutilated and dethroned him. From the drops of his blood sprang the Gigantes, and from the foam gathering around him in the sea, according to some accounts, Aphrodite or Venus.

URANUS, the seventh planet in order of distance from the sun, and the outermost but one of all the known members of the planetary system. Uranus travels at a mean distance of 1,753,869,000 m. from the sun, his greatest distance being 1,835,561,000 m., his least 1,672,177,000 m. Hence it will be perceived that the eccentricity of his orbit is considerable, the greatest exceeding the least distance by 163,384,000 m., or by a greater distance than that which separates Venus from the earth when these two planets are furthest from each other. The eccentricity of Uranus's orbit is in fact 0·046578. As a consequence of this eccentricity, his apparent brightness in different oppositions varies considerably. It is not merely that his distance from the earth varies, but his distance from the sun varies also, and consequently the amount of light he receives from it. When at opposition near to the perihelion of his orbit his distance from the earth amounts to 1,581,700,000 m., and when in opposition near aphelion it amounts to 1,744,100,000 m. As his apparent size varies inversely as the square of the distance from the earth, while his apparent intrinsic brightness varies as the square of the distance from the sun, it follows that his apparent absolute brightness is greater when he is at opposition near perihelion than when he is at opposition near aphelion in the proportion of $(17{,}441)^2 \times (1{,}835{,}561)^2$ to $(15{,}817)^2 \times (1{,}672{,}177)^2$, or as 14,651 to 10,000; that is, nearly as 3 to 2. His orbit is only inclined $46\frac{1}{2}'$ to the ecliptic. His mean diameter is about 33,000 m., the compression of his globe unknown. In volume he exceeds the earth about 74 times; but his density being barely $\frac{17}{100}$ of hers, his mass exceeds the earth's only about 12½ times. Some astronomers assert that marks can be recognized on the surface of Uranus, and that by noting these his rotation period can be determined; but very little reliance can be placed on the assigned period of 9½ hours. The sidereal revolution of Uranus is accomplished in 84 years 6½ days, or 30,686·8208 days; his mean synodical period is 369·5 days, or only 4¼ days more than a tropical year.—Uranus was discovered by Sir W. Herschel on March 13, 1781, when he was examining the constellation Gemini (near η) for double stars. Observing that a star in the telescopic field looked larger than the rest, he suspected it to be a comet. Using higher powers, he found the disk enlarged, which would not happen with a star. He thereupon announced the discovery of a comet. But after a short time it was found that the supposed comet was travelling on a nearly circular orbit around the sun; and it was presently recognized as a member of the sun's family of planets. Herschel called it the Georgium Sidus, and foreign astronomers called it Herschel; but the name Uranus, assigned to it by Bode of Berlin, is now always used. In 1787 Herschel discovered two satellites attending on Uranus, and he afterward supposed he had discovered four others; but there is every reason to believe that he had mistaken in most cases small stars for satellites. It appears probable, however, from an inquiry recently instituted by Prof. Holden of Washington, that among his scattered observations of supposed satellites are some really relating to the two inner satellites discovered later by Lassell. The following are the elements of these bodies according to Mr. Hind, superintendent of the English "Nautical Almanac:"

No.	NAME.	DISCOVERED BY	Mean distance in radii of ♅.	Sidereal period.	Longitude of ☊.	Inclination.
1	Ariel	Lassell	7·44	2d 12h 28m	....	....
2	Umbriel	Lassell	10·37	4 3 27	....	....
3	Titania	W. Herschel	17·01	8 16 55	165° 25′	100° 34′
4	Oberon	W. Herschel	22·75	13 11 6	165 28	100 34

It will be observed that the inclination here assigned is greater than a right angle. What is meant is, that the satellites travel on retrograde paths at an inclination of 79° 26′, the complement of that here assigned. It was found, soon after the discovery of Uranus, that the planet had often been observed as a supposed star by Flamsteed, Bradley, Lemonnier, and Mayer. Lemonnier indeed had observed it 12 times. For the interesting result of these researches see NEPTUNE.—The spectroscope has revealed nothing very satisfactory respecting Uranus, though Huggins suspects the presence of large quantities of hydrogen in the planet's atmosphere.

URBAN, the name of eight popes, of whom the following are the most important. **I. Urban II.** (OTHON DE LAGNY), born at Châtillon-sur-Marne, France, about 1042, died in Rome, July 29, 1099. He was archdeacon of Rheims, and became successively a Benedictine monk, prior of Cluny, cardinal, and bishop of Ostia. He was employed by Pope Gregory VII. in the most important missions, and was elected pope at Terracina in 1088, while Rome was held by the antipope Clement III. He was recognized by all Latin Christendom except Germany, where the emperor Henry IV. with a majority of the bishops sustained the antipope, and England, where William II. remained neutral for some time. In 1089 the Romans, having expelled the antipope, put Urban in possession of his see. He immediately summoned a council, excommunicated Clement, Henry, and their adherents, and concluded a matrimonial union between the celebrated countess Matilda of Tuscany and Guelf, son of the duke of Bavaria. The emperor Henry, incensed thereat, marched to Rome with an army in 1091, restored the antipope, and forced Urban to fly for protection to Robert, count of Apulia. In 1093 Conrad, Henry's eldest son, was prevailed upon by Matilda to side with the pope, who crowned him king at Monza. This alliance enabled Urban to regain possession of Rome, excepting the Lateran and the castle of Sant' Angelo. In March, 1095, he held a council at Piacenza, at which 200 bishops, 3,000 of the inferior clergy, and 30,000 laymen were present, and there received the ambassadors of the Greek emperor Alexius Comnenus, who besought his aid against the Turks. There also Urban first appealed to the Christian princes to unite against the infidels, and this led to the holding of the council of Clermont in Auvergne, Nov. 18. In that assemblage Urban proclaimed the first crusade, giving the cross to multitudes amid the shouts of *Dieu le veult!* and ratified the sentence of excommunication pronounced in 1094 by the council of Autun against King Philip I. of France. In the 12 councils held by him Urban labored to consolidate and perfect the reforms of Gregory VII., and condemned the opinions of Berengarius on the eucharist, and those of Scotus Erigena. At the council of Bari, in 1098, he made a fruitless attempt to effect a union of the Greek and Latin churches. Urban was one of the most influential popes of the middle ages. He declared the election of a pope independent of the assent of the Roman emperor, vigorously enforced the law of celibacy, and forbade bishops and priests to accept ecclesiastical offices from the hands of laymen. **II. Urban V.** (GUILLAUME DE GRIMOARD), born at Grisac, Languedoc, in 1309, died in Avignon, Dec. 19, 1370. He was a Benedictine monk, abbot of Auxerre in 1353 and of Marseilles in 1358, and papal legate in Naples and Sicily, and was elected in 1362, at Avignon, successor of Innocent VI. He went in 1367 to Rome, but in 1370 returned to Avignon. In 1369 the Greek emperor John Palæologus himself visited Rome, abjured the peculiar tenets of the Greek church, and acknowledged the supremacy of the pope. In 1370 Urban sent missionaries to the Tartars and an embassy to Georgia, as the churches of Georgia had joined the Greek church. He was the first pope who blessed a golden rose for princes, presenting it to the queen of Naples. He was a liberal protector of letters, and was praised by his contemporaries as entirely free from nepotism. **III. Urban VI.** (BARTOLOMMEO BUTILLI-PRIGNANO), born in Naples in 1318, died in Rome, Oct. 15, 1389. Before his accession to the papal see he was archbishop of Bari. He was elected successor of Gregory XI. in 1378 by the cardinals assembled at Rome; but the cardinals who were residents of Avignon did not recognize him, and in union with some of the Roman cardinals, who declared his election compulsory, elected Count Robert of Geneva pope under the name of Clement VII. (See CLEMENT VII., antipope, vol. iv., p. 661.) Thus began what is known as the great schism in the Roman Catholic church. When Queen Joanna of Naples, who had supported Urban with an army, abandoned his cause, the pope deposed her and anointed in her stead Charles of Durazzo. With him also Urban soon quarrelled. Charles at his coronation in Rome confirmed Francesco Prignano, the pope's nephew, in possession of several Neapolitan provinces bestowed upon him by Urban; but on his arrival in Naples he refused to dismember his kingdom. Urban, having gone to Naples, was there held prisoner for a time by the king; and having moreover alienated the king of Aragon, Pedro, he found himself abandoned by the cardinals. Six of them, at the instigation of Francesco Prignano, being accused of conspiracy, were cruelly tortured and all put to death, with the exception of Cardinal Eston, an Englishman. Urban was besieged by Charles in Nocera, and fled in 1385 to Genoa and Lucca, but in 1388 returned to Rome. He ordered the year of jubilee to be celebrated every 33 years, instead of every 50 as before, and appointed the first for the year 1390.

IV. Urban VIII. (Maffeo Barberini), born in Florence in 1568, died in Rome, July 29, 1644. Under the pontificate of Gregory XIV. he was governor of Fano, and under Clement VIII. papal prothonotary; in 1604 he was appointed archbishop of Nazareth *in partibus infidelium* and ambassador to Paris, in 1605 cardinal, and in 1608 archbishop of Spoleto. He was elected pope, Aug. 6, 1623. He was a patron of sciences and arts, but left the government mostly to his relatives, who favored France and monopolized the most important offices. Through one of his relatives he was involved in a war with the duke of Parma in 1642, which he was obliged to conclude by an unfavorable peace. He bestowed upon the cardinals, the three clerical electors of Germany (the archbishops of Mentz, Cologne, and Treves), and the grand master of the knights of Malta the title most eminent (*eminentissimus*), which led to a long controversy with Venice. He condemned the doctrine of Jansenius, and under his pontificate Galileo was tried and condemned by the Roman inquisition. He established the college of the propaganda, issued a revised edition of the Roman breviary, gave to the bull *In Cœna Domini* its present form, and forbade priests the use of snuff in church under pain of excommunication. He left a volume of Italian poetry, including 70 sonnets. From his knowledge of Greek he was called "the Attic bee;" his Latin poems were printed in 1640 (*Maffei Barberini Poemata*, fol., Paris).

URBANA, a city and the county seat of Champaign co., Ohio, at the intersection of the Atlantic and Great Western, the Pennsylvania Central, and the Sandusky, Dayton, and Cincinnati railroads, 40 m. W. N. W. of Columbus, and 76 m. N. N. E. of Cincinnati; pop. in 1850, 2,020; in 1860, 3,429; in 1870, 4,276; in 1875, locally estimated at 7,000. It is situated in the midst of a fertile country, and is handsomely built. The trade is important. The largest manufacturing concern is the United States rolling stock company, which employs from 300 to 500 hands. Other important establishments are a boot and shoe factory, a tannery, an agricultural machine shop, a stove foundery, two carriage factories, three tobacco works, a woollen mill, two broom factories, two wagon factories, three lumber yards and flouring mills, and a hub and spoke factory, together employing 300 hands. There are three national banks, with a capital of $100,000 each, and one life and one fire insurance company. The high school building cost $90,000, and accommodates 400 pupils. The city has five free public schools, a Roman Catholic school, and a public library. Urbana university (Swedenborgian), founded in 1851, in 1874–'5 had 4 instructors and a library of 5,000 volumes. A daily and two weekly newspapers and a monthly periodical are published. There are 12 churches, viz.: Baptist (2), Episcopal, Lutheran, Methodist (3), Presbyterian, Roman Catholic, Swedenborgian, United Presbyterian, and a mission church.

URBINO (anc. *Urbinum Hortense*), a city of Italy, in the Marches, capital of the province of Pesaro ed Urbino, on an isolated hill in the midst of bleak mountains, 20 m. S. W. of Pesaro; pop. of the town proper about 6,000, and of the whole commune 15,000. It is the seat of an archbishop. The old walls impart to the city a feudal aspect. It is celebrated as the birthplace of Raphael, and for many historical, artistic, and literary associations. The cathedral and other churches contain remarkable paintings. The finest public building, still unrivalled in the *cinque cento* style, is the ducal palace, built by Frederick of Montefeltro from the designs of Lauranna. The free university dates from 1671, and in 1875 was attended by 71 students. The city also possesses a lyceum, a gymnasium, a technological institute, and an academy of science. In the 16th century it had celebrated manufactures of earthenware, and in the 18th of firearms, needles, and pins, and the latter are still extensive.—Urbino was of some importance under the Romans. In the 6th century it was taken by Belisarius. Pope Sixtus IV. in 1474 bestowed the title of duke upon the counts of Montefeltro, the local rulers. Francesco Maria della Rovere, a nephew of Pope Julius II., succeeded to the duchy in 1508 as the son-in-law of the last duke of the Montefeltro line. Under this dynasty the court of Urbino rivalled that of Ferrara in magnificence and in the patronage of art and literature; its most illustrious associations were with Raphael and Tasso. In 1631, on the extinction of the house of Rovere, the duchy, then comprising hundreds of palaces and many towns, became one of the immediate possessions of the Papal States; and in 1860 it was incorporated with the dominions of Victor Emanuel. The anniversary of Raphael's birth and death, occurring on the same day, was solemnly celebrated at Urbino April 6, 1873, and the house in which he was born was purchased in 1874 by the Raphael academy, to be fitted up as a museum.

URCHIN FISH. See SEA PORCUPINE.

URE, Andrew, a Scottish chemist, born in Glasgow in 1778, died in London, Jan. 2, 1857. He was educated at the universities of Glasgow and Edinburgh, took the degree of M. D., and in 1806 was appointed professor of chemistry and natural philosophy in the Andersonian institution at Glasgow. On the establishment of the astronomical observatory in Glasgow he was placed in charge of it. In 1813 appeared his "Systematic Table of Materia Medica," with a dissertation on the action of medicines, followed in 1818 by a remarkable paper entitled "New Experimental Researches on some of the leading Doctrines of Caloric." He also published a "Dictionary of Chemistry" (1821), a translation of "Berthollet on Dyeing" (1823), a "System of Geology" (1829), and numerous papers on chemical subjects. In 1830 he removed to London, and in 1834 was appointed analytical chemist to the board of customs. His subsequent works are: "The Philosophy of Manufactures" (1835), "The Cotton Manufacture of Great Britain compared with that of other Countries" (1836), and his "Dictionary of Arts, Manufactures, and Mines" (2 vols. 8vo, 1837–'9), which has passed through several editions in England and the United States (5th English ed., revised and enlarged by Robert Hunt and several contributors, 3 vols., 1858–60; 7th ed., enlarged, with more than 2,100 woodcuts, 3 vols., 1875).

UREA. See URINE.

UREDO (Lat. *urere*, to burn), a genus of fungi, to which were formerly referred those minute plants which, under the names of smut, bunt, and rust, sometimes produce such disastrous effects upon grain and grasses. The later authorities in this department of botany place the fungi so injurious to grain crops in other genera; those causing what is known as grain mildew are placed in *puccinia;* that which injures the grain of wheat, and is known as bunt, is a *Tilletia;* the various smuts are included in *ustilago;* and the species thus left in *uredo* are not found upon crop plants to an injurious extent. For a general account of these and their polymorphism see FUNGI; an illustration of the effects of one most injurious to our agriculture is given under MAIZE; for more popular descriptions, see "Rust, Smut, Mildew, and Mould," by M. C. Cooke (London, 1865), and a more recent work by the same author, edited by the Rev. M. J. Berkeley, "Fungi, their Nature and Uses" ("International Scientific Series," New York, 1875).

URFA, or **Orfah.** See EDESSA, Mesopotamia.

URI, a canton of Switzerland, bounded N. by Schwytz, E. and S. E. by Glarus and Grisons, S. by Ticino, from which it is separated by the St. Gothard mountains, and W. by Valais, Bern, and Unterwalden; area, 415 sq. m.; pop. in 1870, 16,107, almost all Roman Catholics speaking German. It is one of the three original cantons of the Swiss league, and one of the Four Forest Cantons afterward confederated. It is celebrated for sublime scenery. The Galenstock, the highest peak of the St. Gothard group (12,481 ft.), is near the village of Hospenthal in this canton, and the Uri Rothstock (9,600 ft.) is near the Mythenstein, commemorative of Tell, near the bay of Uri, on the S. E. end of Lake Lucerne. The road over the St. Gothard pass runs through Uri and Ticino and crosses the Reuss, the principal river of the former canton, over many bridges, the most stupendous being the Devil's Bridge (see DEVIL'S BRIDGE, and REUSS); and it also passes the Urnerloch tunnel or hole of Uri. The new St. Gothard railway tunnel passes near Airolo. This village, Andermatt, and Hospenthal are the best known localities in the Urseren valley, the finest in Uri, which is 9 m. long, 1 m. broad, and 5,000 ft. above the sea. In the lower part of the valley is the defile of Schöllenen, which was repeatedly contested during the memorable campaign of the allies against Napoleon in 1799. Uri is essentially a pastoral country. It abounds in cattle, sheep, and goats, and produces excellent cheese. Despite the rough climate, nut and other trees flourish in the valleys. The revised constitution of 1850 is purely democratic. The canton forms two districts, that of Uri, formerly part of the see of Constance, and that of Urseren. Capital, Altorf.

URIC ACID. See URINE.

URIM AND THUMMIM (Heb. *urim*, light; *tummim*, truth or perfection), a part of the breast apparel of the high priest among the ancient Hebrews. According to one opinion, they denote the four rows of brilliant precious stones in the breastplate of the high priest, upon each of which was engraved the name of one of the sons of Israel. When an appeal was made to God by the high priest in difficult cases, the divine answer was manifested in some way by means of this breastplate, or, in the opinion of some commentators, by an audible voice speaking to the priest arrayed in full pontificals. According to others, the Urim and Thummim were two images personifying revelation and truth placed between the folds of the breastplate. The first time they are mentioned in the Bible, they are referred to as things already familiar to the Israelites: "And thou shalt put in the breastplate of judgment the Urim and the Thummim." (Exod. xxviii. 30.) It is unknown when this oracular method of consulting God ceased. There is no instance of it in Scripture during the time of the first temple, and it certainly was not practised during that of the second. There is a rabbinical saying that God spoke to his people during the tabernacle by the Urim and Thummim, during the first temple by the prophets, and during the second by the Bath-Kol.

URINE, the excrementitious fluid eliminated by the kidneys, and containing the products of disintegration or physiological waste of the animal system. The physical and chemical characters of urine present a general resemblance in different classes of animals, accompanied by special variations in regard to particular ingredients. In the human subject the urine is a light amber-colored fluid, of a watery consistency, a moderately acid reaction, and an average specific gravity of 1·024. Its average daily quantity is 35 fluid ounces, or 2¼ pints; but this amount varies, within certain limits, according to the quantity of fluid taken with the food and drink, and that lost by perspiration or otherwise. If the amount of drink be unusually abundant, a part at least of the water so taken will pass off by the kidneys, and the urine will be increased in proportion. On the other hand, should the perspiration from any cause be unusually active, less fluid will be discharged by the kidneys, and the amount of urine will be consequently diminished. These variations evidently depend simply upon the fluctuation of the watery ingredients of the urine, while its solid constituents are comparatively unchanged in amount. Accordingly, its physical qualities, particularly its color, specific gravity, and acidity, vary under these circumstances in inverse ratio to its quantity. When the urine is abundant from excess of water, it is paler than usual, its acid reaction less marked, and its specific gravity diminished. When it is lessened in amount from deficiency of water, it is more deeply colored, of a strongly acid reaction, and of a high specific gravity. Variations of this kind occur from day to day, owing to incidental causes, and are strictly within the limits of health; since the solid ingredients of the excretion, representing the products of bodily metamorphosis, are still discharged, in either case, in their due proportion. Similar fluctuations in the density, color, and acidity of the urine take place naturally at various periods of the day; that passed in the latter part of the day, during the night, and on first rising in the morning, being usually of a deep color, decidedly acid, and of a high specific gravity, often as much as 1·028; while that passed during the forenoon and middle of the day is comparatively pale, often neutral or but slightly acid, and of a specific gravity sometimes as low as 1·016 or 1·018. The specific gravity 1·024 represents the average density of all the urine passed during 24 hours in a state of health.—The average constitution of human urine is:

Water	938·00
Urea	30·00
Creatine	1·25
Creatinine	1·50
Urate of soda	1·80
Urate of potassa	
Urate of ammonia	
Biphosphate of soda	12·45
Phosphate of soda	
Phosphate of potassa	
Phosphate of lime	
Phosphate of magnesia	
Chloride of sodium	7·80
Chloride of potassium	
Sulphate of soda	6·90
Sulphate of potassa	
Coloring matter and mucus	·30
Total	1000·00

Of these ingredients urea is the most characteristic and important. It is a nitrogenized crystallizable substance, freely soluble in water, and exists in very minute proportion in the healthy blood of man and mammals generally. It represents one product of the physiological waste or retrograde metamorphosis of the system, though it is not yet certain from what special set of tissues or organs it is derived. It is increased by muscular exertion or by a diet of animal food, and diminished by repose or by a diet consisting of vegetable and non-nitrogenous substances. It is constantly eliminated from the blood by the kidneys, during its circulation through their vessels; and this explains the fact that, although it exists in healthy blood only in the proportion of 0·16 part per thousand, it is found in the urine in the proportion of 30 parts per thousand. It is, in fact, constantly drained away from the blood and accumulated in the urine, to be thus discharged from the body. The average quantity in which urea is produced and discharged in man during health is 500 grains a day. If, from ligature of the renal arteries or disabling affections of the kidney, the urea is retained and allowed to accumulate in the blood, it becomes poisonous as soon as its quantity has increased to a certain point, and signs of disturbance of the nervous system and of nutrition generally come on, and become constantly aggravated until they terminate in death. This happens more particularly in both the acute and chronic form of Bright's disease. (See ALBUMINURIA.) Creatine and creatinine are also both nitrogenous crystallizable substances, products of disintegration. They are produced in the muscular tissue, from which they are absorbed by the blood, and thence in turn eliminated by the kidneys. The urates of soda, potassa, and ammonia are combinations of these bases with a nitrogenous acid body of organic origin, namely, uric acid. Uric acid by itself is extremely insoluble in watery fluids, but its saline combinations with the above named alkaline bases are readily soluble in the proportions of water usually existing in the urine. They may however be decomposed by the addition of a free acid to the urine, or by the development of such an acid in it from the changes of decomposition. The new acid then combines with the alkaline bases, and the insoluble uric acid thus set free is deposited in the crystalline form. It is in this way that "uric acid gravel" is formed in the urine, or that calculi composed of uric acid increase in size. The quantity of urates ordinarily discharged by the urine in health is about 25 grains a day. The acid reaction of the urine is due to the presence of the biphosphate of soda, the solutions of which are acid to test paper. The alkaline phosphates, that is, the phosphate of soda and the phosphate of potassa, are themselves soluble in water. The earthy phosphates, on the other hand, that is, the phosphate of lime and the phosphate of magnesia, require an acid fluid for their solution; consequently they are readily held in solution in the urine so long as it maintains its natural acid reaction. But if it be rendered alkaline by the addition or formation of an alkaline ingredient, it at once becomes turbid by the deposit of the earthy phosphates. These deposits may be easily recognized by their being redissolved on the addition of a small quantity of any mineral or vegetable acid. The chlorides and sulphates of the urine are all readily soluble, and seldom or never appear as a deposit. After being discharged from the bladder, the urine, if kept exposed to the atmosphere at a moderately warm temperature, undergoes decomposition. The minute quantity of animal matter existing in the mucus becomes a ferment, and causes the urea to be gradually transformed into carbonate of ammonia. This first neutralizes the acid reaction of the urine and causes it to become turbid from a deposit of its earthy phosphates. Subsequently, as the products of decomposition increase in quantity, the urine becomes strongly alkaline and saturated with the ammoniacal salt, which forms a new crystalline combination, namely, the phosphate of magnesia and ammonia, or the so-called "triple phosphate," and finally exhales from its surface a strong ammoniacal vapor. This goes on until all the urea originally existing in the urine has been thus decomposed and returned to the atmosphere or the soil under the form of an ammoniacal combination.

URN. See BURIAL.

URQUHART, David, a British author, born at Bracklanwell, county of Cromarty, Scotland, in 1805. He was educated at Oxford, travelled in the East, and in 1835 was appointed secretary of legation at Constantinople. He resigned this office in 1836, returned to England, and charged the Palmerston ministry with Russian tendencies and betrayal of British interests, renewing his attacks from Paris in 1840. He was elected to parliament for Stafford in 1847, but failed of reëlection in 1852. He has published "Observations on European Turkey" (1831); "Turkey and its Resources" (1833); "Spirit of the East" (1838); "Exposition of the Affairs of Central Asia" (1840); "Exposition of the Boundary Differences between Great Britain and the United States" (1840); *La crise, ou la France devant les quatre puissances* (Paris, 1840); "Annexation of Texas a Cause of War between England and the United States" (1844); "The Pillars of Hercules, a Narrative of Travels in Spain and Morocco" (2 vols., 1850); "Progress of Russia" (1853); "Recent Events in the East" (1854); and "The Lebanon" (2 vols., 1860).

URQUIZA, Justo José de. See ARGENTINE REPUBLIC, vol. i., pp. 694–'6.

URSA MAJOR, and **Ursa Minor.** See BEAR, GREAT AND LESSER.

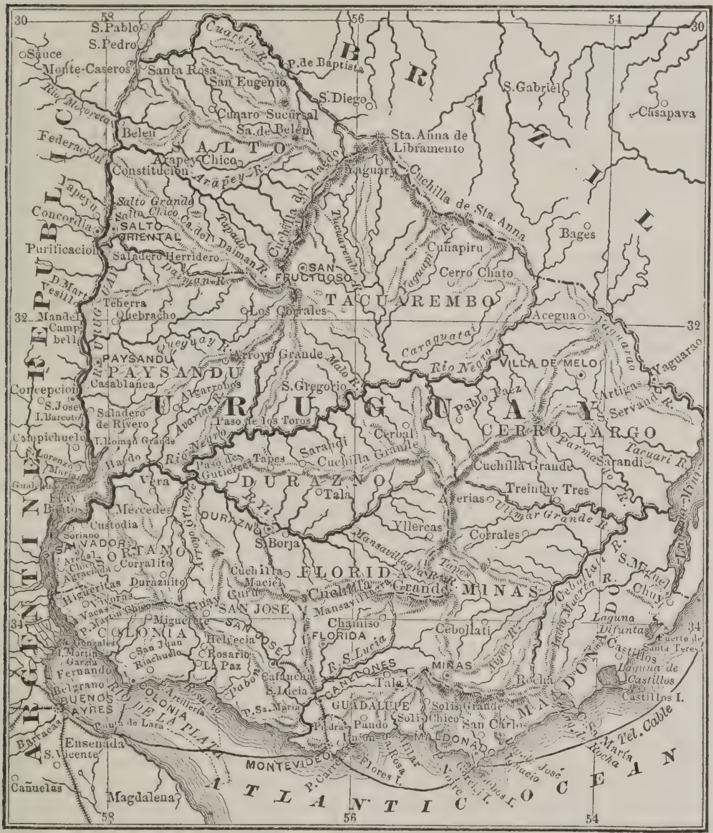
URSULA, a saint of the Roman Catholic church, and, according to the legend, a daughter of a Christian prince of Britain. The date of her martyrdom is variously given as 237, 383, or 451. She was demanded in marriage by a pagan prince, and fearing by a refusal to bring ruin upon her parents and country, she seemingly consented, but obtained a delay of three years, and a grant of 11 triremes and 10 noble companions, each as well as herself attended by 1,000 virgins. She passed the three years with her virgins in nautical exercises; and when the day fixed for her marriage arrived, a sudden wind arose at their prayer, and wafted them to the mouth of the Rhine, and thence to Basel. Here they left their vessels, and made on foot a pilgrimage to Rome. On their return they fell in unexpectedly at Cologne with an army of Huns, by whom they were massacred, Ursula having refused an offer of marriage from the prince. Their corpses were buried by the people of Cologne, and a church was afterward erected in their honor, in which an immense collection of bones is still exhibited as those of Ursula and her companions. The first traces of this legend, which was gradually enlarged, are met with in the 9th century.

URSULINES, a monastic order in the Roman Catholic church, founded at Brescia in 1533 by Angela Merici (born at Desenzano in 1474, died March 21, 1540, canonized May 24, 1807). It was at first a voluntary association of widows and young girls, who undertook the gratuitous education of children of their own sex, devoting their spare hours to visiting the sick and relieving the poor. The members were allowed to live at home, submitting only to such regulations as the nature of their work and other circumstances required. As their numbers increased they formed distinct congregations. In 1541 they assumed for their common dress that worn in the country by widows of the middle class. In 1544 their mode of life was approved by Pope Paul III., and, their establishments becoming numerous in northern Italy, they began to live together in common and to elect local superiors, but without binding themselves even by temporary vows. In 1572, at the instance of St. Charles Borromeo, Pope Gregory XIII. erected the congregation of St. Ursula into a religious order, under the rule of St. Augustine, the members adding to the three ordinary monastic vows a fourth binding them to instruct young girls gratuitously. Several of the local congregations declined to be members of the new order, and with the consent of the church retained their first organization unchanged. Thus, after 1572, the Ursulines were divided into the new or "regular" Ursulines and the "primitive" Ursulines. The first colony established in France was made by Françoise de Bermond at Avignon in 1594, with the special approbation of Pope Clement VIII. In 1608 two members of this establishment went to Paris at the request of Madeleine Lhuillier de Sainte-Beuve, and opened a central house there, which was approved in 1612 by Paul V. Other branches sprang up rapidly around the mother house of Avignon, one of the most fruitful of which was planted at Clermont in Auvergne by Clémence du Ranquet in 1602. The primitive Ursulines also spread beyond the Alps. In 1606 Anne de Saintonge of Dijon formed several establishments of them, which were favored by the bishops and became very popular throughout Franche-Comté, living in strict retirement without being cloistered, binding themselves by permanent vows only after several years of probation, and educating gratuitously the children of the poor. But these only formed a small minority of the French Ursulines, who in 1715 had 11 provinces and upward of 350 monasteries. The first Ursuline colony in America was founded in 1639 at Quebec by Marie Guyart, known as Mère de l'Incarnation, the first processes for whose beatification were begun at Rome by the Canadian bishops in 1869. All the Ursuline convents are under the jurisdiction of the diocesan bishop, and their coherence is so loose that many convents do not even know to which of the numerous congregations they belong. There are Ursuline convents in the United States at Morrisania (New York city), Cleveland, Toledo, and Fayetteville, O., Springfield and Alton, Ill., Columbia, Savannah, and Augusta, Ga., New Orleans, San Antonio, Galveston, Louisville, and St. Louis; and in Canada at Quebec, Trois Rivières, and Chatham. The Ursulines have ceased to exist in Italy, Switzerland, and Germany since 1871.

URUGUAY, or **Banda Oriental del Uruguay,** a republic of South America, lying between lat. 30° and 35° S., and lon. 53° and 58° 30′ W., bounded N., N. E., and E. by Brazil, S. E. and S. by the Atlantic, and S. W. and W. by the Rio de la Plata and the Uruguay, which separate it from the Argentine Republic. Uruguay has a shore line of 200 m. on the Atlantic, 155 m. on the Plata, and 270 m. (in a direct line) on the Uruguay, making 625 m. accessible to shipping; while the land frontier is only 450 m. The sea coast is low, sandy, and devoid of safe harbors; the coast on the Plata is high and rocky, indented by several open bays; and the banks of the Uruguay are generally low, with intervals of moderately high table land. The interior is traversed by chains of wooded hills, from which descend innumerable streams uniting in small rivers, navigable for considerable distances by small craft. Extensive undulating grassy plains (*pampas*) form the chief feature of the country. The Cuchilla Grande is the principal mountain ridge; others are the Carapy, Castellos, and Yerbal. The highest land is the Cerro Pelado in the department of Minas, nowhere exceeding 2,500 ft. above sea level. The Rio Negro rises in the sierra Santa Anna, crosses the republic from N. E. to S. W., dividing it into two nearly equal parts, and after a course of about 350 m. flows into the Uruguay about 80 m. above its junction with the Paraná. Among other rivers are the Dayman, 100 m. long, navigable 18 m.; the Queguay, 150 m. long, navigable 30 m.; the San José and Santa Lucia, respectively 100 and 120 m. long, which unite 12 m. from the estuary of the Plata and are navigable about 25 m.; and the Cebollati, which flows N. E. into Lake Merim in Brazil, receiving numerous tributaries. The climate is mild and healthful. The thermometer ranges from 32° to 88° F.; but on the table lands heavy frosts occur in July and August, and in the low lands the temperature occasionally rises in February above 100° F. An abundance of rain falls in all seasons, but the greatest amount in May and October; snow seldom falls, and rapidly disappears. The temperature occasionally rises 25° in two or three hours, and frequently falls 40° in four hours. The soil is very rich, yielding abundant crops of grain, a great variety of fruits and vegetables, sugar cane, and cotton. Among the trees are the walnut, willow, cedar, myrtle, mulberry, laurel, orange, lemon, olive, fig, pomegranate, apple, pear, almond, peach, plum, cherry, and guava; lignum-vitæ, taruman, and other hard woods; and the quebracho and scarlet willow, which furnish excellent dyes. Among the medicinal plants are the poppy, wormwood, gentian, balsam, coriander, chamomile, liquorice, and sarsaparilla, the last growing in great abundance along the banks of the Rio Negro and its tributaries. Gold, silver, lead, iron, copper, marble, agates, alabaster, and amethysts are found; but the mineral resources are hardly developed, though several mines have lately been opened. Jaguars are sometimes seen along the banks of the Uruguay, and pumas on those of the Rio Negro. The carpincho, deer, ostrich, partridge, duck, parrot, plover, swan, and goose abound. The rivers furnish a variety of excellent fish, and the Plata contains a great many sea wolves. —The republic is divided into 13 departments, which, with their areas, chief towns, and population in 1872, are as follows:

DEPARTMENTS.	Area, sq. m.	Population.	CHIEF TOWNS.	Population.
Cerro Largo.	7,530	33,000	Villa de Melo.........	5,000
Colonia.....	1,900	22,508	Colonia del Sacramento	2,000
Durazno....	4,850	16,281	Durazno..............	1,500
Florida.....	4,100	19,900	Florida...............	2,000
Guadalupe..	1,600	48,000	Canelones............	3,000
Maldonado..	5,150	18,750	Maldonado...........	1,000
Minas......	4,985	27,163	Minas................	1,700
Montevideo.	225	127,704	Montevideo...........	105,000
Paysandú...	7,360	33,052	Paysandú............	9,000
Salto.......	8,125	32,602	Salto.................	10,000
San José....	3.890	20,115	San José............	5,000
Soriano.....	3,125	21,403	San Salvador.........	1,500
Tacuarembo	10,460	34,000	San Fructuoso........	3,000
Total.....	63,300	454,478		

Montevideo is the capital of the republic. Of the population 254,000 are foreigners, including 60,000 Italians, 30,000 each of Basques, Spaniards, and French, 20,000 Brazilians, 10,000 Argentines, 10,000 English and Germans, 2,000 Portuguese, and 12,000 Africans. The aborigines have entirely disappeared. The bulk of the native population is a mixture of Indian, European, and African blood. The characteristics of the lower classes are ignorance, treachery, and cruelty; their occupation as herdsmen, the frequency of civil wars, and the general prejudice against education have prevented the progress of civilization. (See Gaucho.) The language of the country is Spanish.—The number of persons engaged in agricultural pursuits is rapidly increasing. The annual value of wheat and maize alone is more than $3,000,000. In 1874 the mills of Montevideo turned out 62,000,000 lbs. of flour. But the main wealth of the country is in its pasturage. In 1874 the country had 7,254,000 cattle, 1,463,000 horses, and 18,476,000 sheep. The wool, which is of superior quality, is almost wholly exported. The manufactures are confined to a few coarse articles for home use. In 1874 the exports were officially given at $15,240,000, and the imports at $16,320,000. With the addition of contraband shipments to avoid the oppressive export duties, it is computed that the total value of the exports would be not less than $25,000,000. The chief articles exported are hides, wool, skins, tallow, and jerked beef. The imports comprise all kinds of manufactured articles, provisions, and coal. Most of the trade is with Great Britain and France, which together take half the exports; Brazil comes next, and the United States next, taking in 1874 articles to the value of $3,254,000. While the trade with other countries is decreasing, with the United States it is gradually increasing. The arrivals in 1874 were 1,888 vessels, of 986,827 tons; cleared, 1,821 vessels, of 954,712 tons. The mercantile tonnage of the country is almost entirely in small coasters and river steamers. European steamers arrive and depart almost daily. There are 176 m. of railway in operation, about 200 m. in course of construction, and 500 m. in contemplation. The telegraph lines in operation aggregate 1,300 m. There is telegraph connection with Europe and North America by way of Rio de Janeiro, and also by way of Buenos Ayres and Chili.—The form of government is in theory republican, similar to that of the United States, but in practice it is a military despotism alternating with anarchy. The constitution provides for the equal rights of all men, prohibits slavery, guarantees freedom of the press and liberty of conscience, and to foreign residents the same rights as natives, with exemption from military service. The president is elected for four years, but may not be reëlected until after a lapse of four years. He appoints four ministers, viz., of the interior, foreign affairs, finance, and war. The legislature consists of a senate of 13 senators, one from each department, elected for six years and presided over by a vice president elected for four years, and a house of deputies of 40 members elected for three years. It is in session from Feb. 1 to June 15, but a committee of two senators and five deputies sits during the year. The courts comprise a supreme tribunal of five judges, two criminal courts, two civil judges, a tribunal of commerce, and several district judges for hearing petty cases. The ecclesiastical authorities are a bishop and provisor general of the Roman Catholic church. The municipal boards or juntas have control of the



public schools, markets, and roads. The revenue for 1874 was $6,375,000; the expenditures were $8,500,000. Of the former seven-eighths is derived from customs, nearly half of which is set apart to pay interest on and provide a sinking fund for the public debts. The revenue for 1875 was estimated at $7,442,000, and the expenditures at $6,775,738. There was a falling off of $813,600 in the customs receipts during 1874. On Jan. 1, 1875, the public debt was $42,357,695. In 1875 the army consisted of 573 officers and 2,797 men, the national guard numbering 20,000. The navy consists of one gunboat of four guns and three tugs of one gun each. There were 245 schools, of which 134 were private, with an average attendance of 16,786 pupils. There were 26 newspapers, with a daily aggregate circulation of 18,000 copies. The churches number 47 Roman Catholic and 3 Protestant. There are four convents, one university, one public library containing 10,000 volumes, several charitable institutions, eight lighthouses, and three dry docks, two in Montevideo and one in Colonia. Of the four banks formerly existing in Montevideo, one failed in 1875, and it was proposed to fuse the other three in a national bank. The decimal and metric systems of values, weights, and measures have been in use since 1864. The *peso* of 100 *centavos* is equal to $1 05 American coin.—The first permanent settlement of the territory was by Jesuit missionaries on the Uruguay in 1622. Subsequently other Spanish colonies were established. The Portuguese, desirous of extending the southern boundary of Brazil to the Plata, also established colonies, notably that of Colonia in 1680, and soon afterward another on the present site of Montevideo. These two nations were engaged in a continuous struggle for possession till 1724, when the Spanish were victorious, and in 1776 the territory was included in the viceroyalty of Buenos Ayres as the district of Banda Oriental. When the war for independence began in 1811 the Banda Oriental at first sided with Buenos Ayres, but in 1814, Montevideo having been rescued from the Portuguese, who had invaded the country, it fell under the power of José Artigas. (See Artigas.) The Portuguese again invaded the country in 1816, and, after the fall of Artigas, in 1821 forced the legislature to decree annexation to Brazil. When Brazil became an independent empire the Banda Oriental was included as a Brazilian province under the title of Cisplatina. In 1825 a revolution broke out, and the independence of the country was declared, which in 1828 was recognized, the N. part, known as the Seven Missions, being ceded to Brazil, and the remainder becoming an independent state entitled Republica del Uruguay Oriental. Internal dissensions began soon after the adoption of the constitution in 1830. Two parties, known as the reds and the whites, terribly distracted the republic. In 1839 one of the unsuccessful candidates for president, Oribe, head of the whites, aided by Rosas, the dictator of Buenos Ayres, raised an army, invaded the country, and subsequently laid siege to Montevideo. This siege lasted nine years, and the war reduced the state to the verge of ruin. England and France interfered and compelled the combatants to lay down their arms. The overthrow of Rosas resulted in the restoration of peace in 1852, which lasted till 1860, when Flores, an ex-president, invaded the country and provoked a civil war. He was defeated at Las Piedras, Aug. 16, 1863. In 1864 war broke out between Uruguay and Brazil. Aided by the Brazilian army, Flores entered Montevideo, Feb. 23, 1865, became provisional president, and renewed the treaties with Brazil. On May 1 the Argentine Republic, Brazil, and Uruguay made a treaty of alliance against Paraguay, and on Aug. 17 the allies under Gen. Flores defeated the Paraguayans. (See Paraguay.) In 1866 Vidal was elected president of Uruguay. On Feb. 19, 1868, during an insurrection at Montevideo, Flores was assassinated. In March, 1868, Gen. Lorenzo Battle became president. Another revolution broke out in 1870 and continued without decisive results till 1873, when José Ellauri was elected president. He was subsequently deposed by his own party, the reds, and succeeded in 1875 by Pedro Varela, who in his turn was forced to resign in March, 1876, Señor Latorre assuming the dictatorship.

URUGUAY, a river of South America, which rises on the W. slope of the Serra do Mar in the Brazilian province of Santa Catharina. During the first 75 m. of its course it flows N. W. through the plains of Las Vacas, where it unites with the Pelotas and is increased by numerous small tributary streams. It is subsequently joined by the Pepiri-Guassú, and turns S., forming the boundary between the Brazilian province of São Pedro and the Argentine provinces of Corrientes and Entre-Rios, from all of which it receives many additions. At its junction with the Ibicuy, which rises in the Sierra Geral, it is 600 yards wide. In lat. 30° 14′ S. it receives the Quaraim, an important tributary, 160 m. long, and navigable for 30 m., which marks the boundary between Brazil and Uruguay. The Uruguay is here 1,500 yards wide, and divided by a line of wooded islands. Thence to its mouth it is the boundary between the Argentine Republic and Uruguay. The western shore is high, steep, and wooded, the eastern very varied and picturesque. The next important tributary is the Arapey from the east; here the bed becomes rocky and the current more rapid, until it forms the cataract of Salto Grande, which is about 250 m. above its junction with the Paraná. This is frequently passed by steamers during high floods, and above it there is unimpeded navigation for vessels drawing 5 ft. for a distance of 300 m. Below it the river is rapidly augmented by numerous tributaries, until in the lower part of its course, for nearly 100 m., it becomes a lake, varying in width from 4 to 7 m. The right bank is here low, wooded, and often marshy; the left is formed by the slopes of hills 200 to 500 ft. high, intersected by numerous streams and interspersed with settlements. In lat. 34° it unites with the Paraná to form the Plata. The Rio Negro is its largest affluent. The total length of the Uruguay is 1,020 m. Its waters are always clear and limpid. Its islands, much less numerous than in the Paraná, are mostly high and rocky. On the island of Higuerita is a populous town. On its banks are the Uruguayan towns of Fray Bentos, Paysandú, and Salto, the Argentine towns of Concepcion and Porto Ruiz, the port of Gualeguaychú, and the Brazilian towns of Uruguayana and Itaqui. The main stream is navigable about 600 m. for flat-bottomed steamers and 200 m. more for boats. The annual freshets occur in September or October, sometimes with great rapidity. The average rise is 20 ft., but occasionally there is a difference of 40 ft. between extreme high and low water.

URUMIAH, or Oroomiah. **I.** A town of Persia, in the province of Azerbijan, 65 m. S. W. of Tabriz; pop. estimated by the Austrian consul general in 1872 at 50,000 (other estimates varying from 25,000 to 40,000), chiefly Mohammedans, but including several thousand Jews and Nestorians. Embosomed in foliage and orchards, Urumiah is one of the most beautiful towns of Persia, extending over a mile, and having fine open spaces and gardens and several good streets. The jurisdiction of the local authorities extends over 10 districts, with an aggregate population of about 150,000. The Protestant mission here has been transferred from the American board of foreign missions to the Presbyterian board, whose organization in the neighboring village of Seir dates from the end of 1872. It comprises a printing office, which in that year issued 3,230 volumes in the old and new Syriac languages, 3 main and 50 subsidiary stations, 50 native preachers, 95 teachers, 55 schools, a female seminary, and more than 700 church members. In the vicinity of Urumiah are mounds believed to have been used in early periods for the rites of the fire worshippers. Urumiah, under the name of Thabarma, was by the early Persians held sacred as the birthplace of Zoroaster. **II. Lake,** a body of water in the vicinity of the town, forming an oblong and shallow basin, nowhere exceeding 24 ft. in depth, extending in its longer direction from N. N. W. to S. S. E. over 80 m., with an average width of about 25 m. It is 4,200 ft. (according to Rawlinson) above the sea level. Its waters, heavily impregnated with salt, resemble those of the Dead sea; the color is deep blue, whence the Armenian name of Kapotan Zauw, "Blue sea." On the E. side a peninsula projecting far into the lake divides it into unequal northern and southern portions; the latter and larger contains a group of islands, some of which are large. The lake receives many important streams. Among the most interesting towns near the E. shore is Maragha, which once had an immense population, now reduced to about 20,000, after which the lake is called by the Arabs.

URUS. See AUROCHS.

USES. The word *usus* was employed in the Roman civil law, and there meant a right to take so much of the fruit or profit of a thing as was needed for sustenance; while *usufructus* had a larger meaning, including a qualified right of possession. In the law of England and the United States, the word use has a precise meaning, which is similar to that of the *fidei commissum* of the Roman law. It means a confidence reposed in one who has the property (or to whom it is given) in possession, that he will hold it for the use or benefit of another, who is called in Norman French the *cestuy que use.* A Roman magistrate (a prætor) was charged with the enforcement of these *fidei commissa*, and was called *commissarius.* When uses became common in England, the chancellor, under whose jurisdiction they passed, had much the same duty to perform as the Roman *commissarius;* and indeed Lord Bacon calls this magistrate a Roman chancellor.—Uses were invented in England to avoid and defeat the statutes of mortmain (see TRUST); and to protect those statutes against uses, the statute of 27 Henry VIII., commonly called the statute of uses, was enacted. This provided that any person or corporation entitled to a use in fee simple, fee tail, or otherwise, should stand seized and possessed of the land itself, in the like estate which they had in the use; the intention being to subject a conveyance to the use of any one, and the property and the *cestuy que use*, to the same legal restraints and liabilities as if the conveyance had been made directly to the *cestuy que use.* This statute was said, in legal phraseology, "to execute the use." It was intended to prevent conveyances to use, by making them of no effect where they violated the statutes of mortmain, and of no more effect than a direct conveyance where they did not. Still such uses as the law permitted, or as courts of equity could protect, were found to be exceedingly convenient, and became common; and courts of equity retained their hold upon them, the person to whom the conveyance was made being considered as having the legal estate, subject to the rules of law and the jurisdiction of courts of law, while the *cestuy que use* has an equitable estate subject to the rules and the courts of equity. This is now the prevailing condition of the law of uses in England and in the United States. But the whole system of law and of equity in regard to uses has become as intricate and extensive as it is important. Here we can do no more than indicate the principal rules of this system.—There can be no use, unless: 1, there is a person capable in law of taking it; 2, a person capable in law of being seized of the property to the use of the other; 3, an express declaration of use, or a consideration and a transfer or contract from which the court will imply a use; and 4, sufficient estate or property or interest to sustain a use. Then, if a use exists which the courts can recognize, it is descendible, or heritable, or devisable, or transferable according to the rules of law or equity, in conformity with the provisions in the instrument creating the use. If the *cestuy que use* of land be married, his widow has no dower, and the husband of a *cestuy que use* has no tenancy by courtesy, because the *cestuy que use* has no seisin, nor can he bring an action at law respecting it. The seisin is in the feoffee-to-use, and while his legal estate is subject to all legal incidents at law, equity will subject all these legal incidents to the equitable requirements of the use.—Trusts and uses are often spoken of together, and from the article on Trusts their similarity or analogy will be seen. They differ however in important particulars.

USHANT (Fr. *Ouessant*), the chief of seven islands known as *îles d'Ouessant*, belonging to the department of Finistère, about 11 m. from the nearest coast of France, and 25 m. W. N. W. of Brest; extreme length nearly 5 m., breadth 3 m.; pop. about 2,400. The shores are bold and rocky, and the landing places few. The formation is mainly granitic, and the soil is fertile, with excellent meadows and pasture lands, and many horses and sheep are reared. The inhabitants are principally occupied in fishing. The lighthouse is in lat. 48° 28′ N., lon. 5° 3′ W. Off Ushant the British fleet under Sir Edward Hawke gained a victory over the French under Admiral Conflans on Nov. 20, 1759; and there was an indecisive action between the English under Admiral Keppel and the French under Count d'Orvilliers on July 27, 1778.

USHER, James, an Irish prelate, born in Dublin, Jan. 4, 1580, died in Reigate, Surrey, March 21, 1656. He was educated at Trinity college, Dublin, was ordained priest in 1601, and soon after was appointed "Sunday afternoon preacher before the state" in Christ church, Dublin. In 1603 and 1606 he visited England and became acquainted with Sir Thomas Bodley, Sir Robert Cotton, and other distinguished persons; and from this time he often visited the English libraries. In 1607 he was chosen professor of divinity in his college, and became chancellor of the cathedral of St. Patrick. In 1620 King James nominated him to the see of Meath; in 1623 he was made a member of the Irish privy council; and in January, 1624, he was raised to the archbishopric of Armagh and the primacy of the Irish church. While he was visiting England in 1641, his house was destroyed by the rebels, with nearly all he possessed, and he did not return. Charles I. conferred upon him the bishopric of Carlisle, to be held *in commendam.* In 1647 he was chosen preacher to the society of Lincoln's Inn, and served in term time for nearly eight years. He published *Annales Veteris et Novi Testamenti* (2 vols. fol., 1650–'54), in which he set forth the system of sacred chronology which has been largely adopted, and is printed in the margin of the English Bible. He also wrote works on the incarnation, British ecclesiastical antiquities, variations of the Hebrew text, &c. A complete edition of his works has been published by the Dublin university in 17 vols. (1841–'64).

USUMASINTA RIVER. See Guatemala.

USURY. Originally this word meant any taking of money for the use of money; and he was therefore a usurer who, lending money, required in payment anything more than the amount which he lent. This was once considered a great moral wrong, but it is no longer deemed more wrong to take pay for the use of money than for the use of a house, or a horse, or any other property. But the lingering influence of the former opinion, together with the fact that the nature of money makes it easier for the lender to oppress the borrower, has caused nearly all Christian nations to fix by law the rate of compensation for the use of money. If compensation be taken within this limitation of law, it is called interest; but if more be taken than the law allows, this in the present meaning of the word is usury. The opinion that money should be borrowed and repaid, or bought and sold, upon whatever terms the parties should agree to, like any other property, has of late years gained ground almost everywhere; and where usury laws are in force, this opinion has perhaps exerted some influence upon adjudication. In England, in the reign of Henry VIII., interest at 10 per cent. was made lawful; in the time of James I. it was reduced to 8 per cent.; during the commonwealth it was 6 per cent., and this was again enacted by 12 Charles II.; the statute of 12 Anne reduced it to 5 per cent. The act 3 and 4 William IV. exempted from the operation of the usury laws bills having more than three months to run. After several modifications in the reign of Victoria, the act 17 and 18 Victoria, ch. 90, repealed all laws then in force relating to usury, providing only that the rights and remedies of persons in respect to acts previously done should not be affected by the statute.—In the United States, the usury laws differ in different states, and are not perhaps precisely the same in any two. In Louisiana 5 per cent. is the legal rate; in Connecticut, Georgia, Kansas, Michigan, Minnesota, New Jersey, New York, South Carolina, and Wisconsin it is 7; in Alabama, Florida, and Texas it is 8; in California, Nebraska, Nevada, and Oregon it is 10; in all the others it is 6. But the statutes vary exceedingly as to the legal effects of usury. In California, Florida, Maine, Massachusetts, Nevada, South Carolina, and Texas, the parties may agree on what rate they will, and the legal rate takes effect only in the absence of agreement; in New Hampshire, New York, North Carolina, and Tennessee, the whole contract is avoided by a reservation or agreement for more than the legal rate. Regarding these as extremes, in much the greater number the penalty for usury lies between them. In some states the legal rate takes effect when there is no agreement, but the parties may agree for more up to a certain definite limit.—There are many ways in which the usury laws may be evaded, and courts watch contracts liable to this abuse with great strictness. Some principles may be gathered from the adjudications, which may be regarded as prevalent, if not universal. Thus, to constitute usury, there must be substantially a loan, and a usurious intent in both parties, in one to give and in the other to take usurious interest. But the contract need not be, in form, a loan; and whether it is so in fact is a question for a jury. Property may be sold for whatever price the parties agree upon; but if the sale be in fact a mere cover for the usury, it does not protect it. Negotiable paper may be sold like other paper. The cases on this subject are numerous, nice, and perhaps conflicting; but it may be stated as a general rule, that if it is in fact the promissor who sells, and the buyer buys even through an agent, but with knowledge that he buys of the promissor, it is in fact and in law a loan from the buyer, and may therefore be usurious. Even if a statute declares a usurious contract "void" in the most emphatic language, the law looks upon it rather as "voidable;" and therefore no one can make the objection of usury but the borrower and the parties in privity of interest and contract with him. So, if one borrows stock, agreeing to replace it with the dividends received in the mean time, or if he agrees to replace it, or the money it sells for, with interest on its value, the contract is not usurious; but if the lender retains an option to take either the dividends or interest, it is usurious. If a note be given usuriously in payment of or as security for a preëxisting debt, and the note is void by the usury laws, the original debt remains unaffected. As there must be usurious intent, if illegal interest is taken by a miscalculation or other mistake in fact, it is not usury; but it is usury if the mistake be one of law, because every person is held to know the law. If the lender takes upon himself an extra risk (apart from that of the borrower's insolvency), he may charge extra interest. Bottomry and respondentia contracts are founded on this principle, because if the ship or goods are lost, the debt is not demandable. The same principle is applied to the purchase of an annuity, and even to the bargain of the borrower that if he does not repay the principal when due with legal interest, he will pay a certain penalty, because he has the power of avoiding this penalty by payment of interest. If a borrower on repaying the money make the lender a gift, it is usurious if the gift be in performance of a previous promise, but not otherwise. Discount of interest, whereby the lender gets interest on his interest, or interest on money which he never lends, and calculations of interest by Rowlett's tables, which consider the year as consisting of only 360 days (but qualify the error by casting the fractions on the right side), are now established usages, and do not make the contract usurious, especially if it is of a kind that is usually subjected to this usage, as are bank discounts. Wherever usury is forbidden, a bargain for compound interest would not be enforced. But it is common for courts to order a settlement of accounts with annual rests, which is equivalent to compound interest. This is especially done where trustees have used the money of their *cestuy que trust.*

UTAH, a territory of the United States, situated between lat. 37° and 42° N., and lon. 109° and 114° W.; general length N. and S., about 350 m.; general breadth, about 260 m.; area, 84,476 sq. m. It is bounded N. by Idaho and Wyoming, E. by Wyoming and Colorado, S. by Arizona, and W. by Nevada. It is divided into 20 counties, viz.: Beaver, Box Elder, Cache, Davis, Iron, Juab, Kane, Millard, Morgan, Piute, Rich, Salt Lake, San Pete, Sevier, Summit, Tooele, Utah, Wahsatch, Washington, Weber. Salt Lake City (pop. in 1870, 12,854) is the capital and largest city. The principal other places are Ogden (pop. 3,127), Provo (2,384), Morgan City (1,972), Logan (1,757), Spanish Fork (1,450), Mount Pleasant (1,346), Brigham City (1,315), Nephi City (1,286), Manti (1,239), Beaver City (1,207), Ephraim City (1,167), and Tooele City, Fillmore, Corinne City, Heber City, and Willard City, with more than 500 inhabitants each. The population of the territory, according to the United States censuses, has been as follows: in 1850, 11,380, including 24 free colored persons and 26 slaves; in 1860, 40,273, including 30 free colored persons, 29 slaves, and 89 Indians; in 1870, 86,786, including 118 colored persons, 445 Chinese, and 179 Indians. The tribal Indians (not enumerated in the census) numbered 1,040 in 1875, including 650 Uintah Utes on a reservation of 2,039,040 acres in the N. E. corner of the territory, together with 134 Pah Vants and 256 Goship Utes not under an agent. Of the total population in 1870, 56,084 were natives of the United States and 30,702 foreign born, 44,121 males and 42,665 females. Of the natives, 41,426 were born in the territory, 2,247 in New York, 2,105 in Illinois, 1,492 in Iowa, 1,315 in Pennsylvania, 1,133 in Ohio, and 908 in Missouri; and there were persons living in the territory born in every other state and nearly every territory. Of the foreigners, 20,772 were natives of the British isles, including 16,073 English, 502 Irish, 2,391 Scotch, and 1,783 Welsh; 4,957 of Denmark, 1,790 of Sweden, 687 of British America, 613 of Norway, and 509 of Switzerland. There were 15,344 males and 15,072 females between 5 and 18 years of age, 14,603 males between 18 and 45, and 18,042 males 21 and upward, of whom 10,147 were citizens of the United States and 7,895 unnaturalized foreigners. The number of families was 17,210, with an average of 5·04 persons to each; of dwellings, 18,290, with an average of 4·75 to each. Of persons 10 years old and upward, 2,515 could not read and 7,363 could not write, of whom 3,334 were natives and 4,029 foreigners. There were 29 blind persons, 18 deaf and dumb, 25 insane, and 23 idiotic. Of the 21,517 persons 10 years old and upward returned as engaged in all occupations, 10,428 were employed in agriculture, 5,317 in professional and personal services, 1,665 in trade and transportation, and 4,107 in manufactures and mining.—Utah is divided into two parts by the Wahsatch mountains, which cross it from N. E. to S. W. The W. part belongs to the Great Basin, its waters having no outlet to the ocean, while the E. part is drained by the Colorado river of the West. The surface is elevated; the valleys lie from 4,000 to 6,000 ft. above the sea, and the mountains attain an altitude of from 6,000 to upward of 13,000 ft., the highest peaks rising above the line of perpetual snow. The region E. of the Wahsatch range has a greater number of streams (which, however, nearly all flow through deep and precipitous cañons and are not generally available for irrigation) and is more rugged and mountainous than that W. of it. The Uintah mountains extend E. from the Wahsatch range along the S. border of Wyoming. The Roan or Book mountains lie partly in Utah and partly in Colorado, between the Grand and White rivers. The Little mountains are W. of Green river, and extend N. W. and S. E. between White and Uintah rivers, joining the Wahsatch range. The Sierra Lasal is S. E. of Grand river near the E. boundary, and S. of it are the Sierra Abajo and Orejas del Oso. The San Juan range and Sierra Panoche are near the S. boundary, the former W. and the latter E. of the Colorado river. The S. E. portion of the territory is less mountainous than the N. E., consisting of extensive undulating plateaus. W. of the Wahsatch range the country consists of a series of disconnected valleys, generally having a N. and S. direction, formed by ridges and mountain ranges, among which are the Thomas, Iron, Guyot, Goshoot, Pijarajabi, Oquirrh, and Raft River mountains. —The Colorado river is formed in Piute co. by the junction of the Grand and Green, and flows S. W. into Arizona. Its chief tributary from the east is the San Juan, and from the west the Dirty Devil. Green river enters the territory at the N. E. corner from Wyoming, and has a general S. course to its junction with the Grand. Its chief tributaries are the White river from the east, and Brush creek, Ashley's fork, Uintah, White, and San Rafael rivers from the west. Grand river enters from Colorado near the centre of the E. boundary, and flows S. W. to the Green. The S. W. corner of the territory is watered by the Rio Virgin, which flows S. W. and joins the Colorado in Nevada. W. of the Wahsatch mountains are several lakes, of which those with no outlet are impregnated with alkaline substances. The largest of these is Great Salt lake in the N. W. part of the territory. (See Great Salt Lake.) S. of this lake, into which it flows through the river Jordan, 45 m. long, is Utah lake, a sheet of pure fresh water abounding in fish. It is triangular, has an area of about 130 sq. m., and is closely bordered with mountains. Its chief tributaries are Salt creek from the south, Spanish fork from the southeast, and the Provo or Timpanagos river from the northeast. The principal tributaries of Great Salt lake, besides the Jordan, are the Ogden and Weber rivers on the east, and Bear river, which empties into Bear River bay in the northeast. Bear river rises at the junction of the Wahsatch and Uintah mountains near the S. W. corner of Wyoming, flows N. into Idaho, then bends N. W. and S., and reëntering Utah maintains a S. course to its mouth. Bear lake, partly in Idaho and partly in Utah, is connected with it. Sevier river has its sources in the S. part of the territory, flows N. for about 150 m., receiving several tributaries from the east, the most important of which is the San Pete, then bends S. W. and flows about 50 m. further into Sevier lake. The latter is 25 by 10 m. in greatest extent, about 100 m. S. S. W. of Great Salt lake. Beaver lake, S. E. of Sevier lake, receives the waters of Beaver river. Among other small lakes in this region are Little Salt lake and Fish lake; the latter contains fresh water, and is connected with Sevier river.—The principal geological formations are the cretaceous, triassic and Jurassic, tertiary, eozoic, alluvial, and Cambrian and Silurian. The cretaceous and triassic prevail in the southeast; the Wahsatch and Uintah mountains are cretaceous, triassic, and Cambrian; the extensive desert W. and S. W. of Great Salt lake is alluvial; while the rest of the territory is mostly tertiary. In the San Pete valley, 90 m. S. of Salt Lake City, are extensive deposits of coal. This is a lignite of superior quality and probably of cretaceous age. The coke from it, though inferior to that of the Pittsburgh coals, can be used in lead-smelting furnaces. Valuable deposits of the precious metals occur in the two mountain ranges between which the Jordan flows, the Wahsatch on the east and the Oquirrh on the west. These ranges are traversed by cañons, usually narrow and precipitous, opening into the Jordan valley, and affording access to the mining districts. The Utah Southern railroad, with several narrow-gauge branches, furnishes transportation to the smelting works in the valley and to Salt Lake City and Ogden. Lead ores, carrying silver, were discovered by Mormons in Beaver county in 1858, and large quantities of lead were produced, but the presence of silver was not then known. In 1863 silver-lead ores were discovered in Bingham cañon (Oquirrh range) by a party of the California volunteers. The early attempts to work these deposits were unprofitable, in the absence of skilled metallurgists and of railroad transportation. Gulch mining for gold in Bingham cañon began in 1868, and was continued with favorable results, in a limited field, for several years. The development in 1869 of the famous Emma deposit, in Little Cottonwood cañon (Wahsatch range), was the beginning of much excited activity in mining, in which even the Mormons, whose leaders had discouraged this industry, gradually took part. The large influx of miners from other territories, the construction of railroads, and the erection of more than 30 smelting and refining works, have widely developed the mining industry and brought about great political and social changes in the territory. The Emma mine, sold to an English company for £1,000,000, is said to have disappointed both the owners and the purchasers, and to be an irregular deposit in limestone, the available portions of which have been exhausted. The principal mining districts are as follows: Parley's Park, Big Cottonwood, Little Cottonwood, and American Fork, in the Wahsatch range; West Mountain or Bingham, Dry Cañon, Ophir, and Camp Floyd, in the Oquirrh range; Tintic and West Tintic, in the Tintic mountains; and South Star, North Star, San Francisco, and Lincoln, in the S. W. part of the territory. The ores are chiefly argentiferous carbonate of lead and galena, with some copper ore in the southern districts, and in a few localities ores sufficiently free from lead and other base metals to be successfully reduced by the Washoe process of stamping and pan amalgamation. The value of gold, silver, and lead produced in Utah since 1868, according to R. W. Raymond, United States commissioner of mining statistics, has been as follows:

YEARS.	Gold.	Silver.	Lead.	Aggregate.
1868–'9..	$600,000	....	....	$600,000
1870.....	300,000	$1,000,000	....	1,300,000
1871.....	221,000	2,079,000	$500,000	2,800,000
1872.....	100,008	2,345,279	675,477	3,120,764
1873.....	52,426	3,725,775	958,365	4,736,566
1874.....	92,093	3,819,508	1,430,044	5,341,645
1875.....	181,765	2,955,923	1,080,459	4,218,147
Total..	$1,547,292	$15,925,485	$4,644,345	$22,117,122

In 1875 there were also produced $102,148 worth of copper, $26,878 worth of iron, and $400,000 worth (50,000 tons) of coal. In the N. part of the territory, in the vicinity of Ogden and Brigham City, are numerous hot springs.—In the valleys the climate is generally mild and healthful, with little snow; the days are often hot in summer, but the nights are always cool; spring opens in April, and cold weather rarely sets in till December. On the mountains the winters are severe and the snowfall is more abundant, furnishing an unfailing supply of water for the streams in summer. There is considerable rain in the valleys from October to April, the weather during the rest of the year being dry, and rendering irrigation necessary to agriculture. The weather in spring and autumn is changeable. The annual precipitation of rain and melted snow varies from about 8 inches in the southwest to about 20 inches in the northeast. At Corinne on the Central Pacific railroad, N. E. of Great Salt lake, the mean temperature of the 12 months ending Sept. 30, 1872, was 49·2°; of the hottest month (July), 75°; of the coldest month (January), 26·6°; total rainfall, 17·13 inches. The mean temperature of the following 12 months was 48·18°; of the hottest month (July), 76·2°; of the coldest month (February), 24·3°; rainfall, 15·62 inches. The mean temperature of the year 1870 at Camp Douglas, near Salt Lake City, was 51·51°; of the hottest month (July), 76·45°; of the coldest month (December), 27·03°; maximum observed, 96°; minimum observed, 3°; rainfall, 15·1 inches. The valley of the Rio Virgin in the southwest is much warmer. The climate is generally healthful. The number of deaths reported by the census of 1870 is 891, of which 99 were from cholera infantum, 84 from pneumonia, 78 from fevers, 63 from consumption, 56 from measles, 52 from enteritis, and 46 from diarrhœa.—Much of the soil of Utah possesses the elements of fertility, and when irrigated produces good crops. In narrow belts around the lakes and springs and along the streams the moisture is sometimes sufficient without irrigation; but the plains in their natural state are for the most part hard, dry, and barren, frequently covered with a saline incrustation, and producing only sage brush and occasional tufts of sand grass and buffalo or gama grass. The mountain slopes in many parts are well covered with buffalo grass. The higher portions of the Wahsatch and Uintah mountains have a good growth of pine and fir, with some quaking ash, cedar, spruce, &c.; and there are considerable quantities of pine on the Oquirrh mountains, W. of Salt Lake City, on the range E. of Utah lake, and on the promontory in the N. E. part of Great Salt lake. Elsewhere there are no important forests, though occasional copses of willow, box elder, cottonwood, and dwarf ash occur along the streams. The principal settlements are along the W. base of the Wahsatch mountains and in the valley of the Rio Virgin, where by the construction of canals an extensive system of irrigation has been put in operation. The chief agricultural localities are the Malade valley; Cache valley, watered by Bear river; the Weber valley; Salt Lake valley, as the tract along the S. E. shore of Great Salt lake is called; the Jordan valley; Tooele valley, W. of the Jordan; the basin of Utah lake, especially on the east; Rush valley, W. of Utah lake; the San Pete valley; the Sevier valley; and the Rio Virgin valley. The region E. of the Wahsatch mountains is little known, but in the valleys of the Uintah and some other tributaries of the Colorado there is considerable irrigable land. The principal agricultural productions are wheat, oats, barley, potatoes, and other root crops. The nights are generally too cool for Indian corn, except in Salt Lake valley and the valley of the Rio Virgin. Apples, pears, peaches, plums, and grapes grow well. Large quantities of fruits, vegetables, and berries are dried or canned for shipment to Wyoming, Montana, Idaho, and Nevada. Cotton, figs, pomegranates, and other tropical fruits are grown in the Rio Virgin valley. The crops have frequently suffered from the devastations of locusts ("grasshoppers"). Utah presents fewer obstacles to grazing than to agriculture, large tracts impracticable to the farmer being well suited to the stock raiser. The buffalo and sand grass, and the wild sage when touched by frost, furnish nutritious food for cattle. Cache valley is one of the finest grazing districts, and in the valley of Green river there is an extensive region possessing superior advantages for sheep raising. The herdsmen drive their stock high up on the mountain slopes in summer, reserving the valleys for winter. Numerous herds are pastured on the mountain ranges E. of the Wahsatch in summer, and on the approach of winter are driven across that range into Salt Lake valley, where little shelter or prepared food is required.—According to the census of 1870, the number of acres of land in farms was 148,361, of which 118,755 were improved; number of farms, 4,908, of which 803 contained less than 10 acres each, 1,660 from 10 to 20, 2,019 from 20 to 50, 316 from 50 to 100, 107 from 100 to 500, and 3 more than 500; cash value of farms, $2,297,922; of farming implements and machinery, $291,390; wages paid during the year, including value of board, $133,695; estimated value of all farm productions, including betterments and additions to stock, $1,973,142; value of orchard produce, $43,938; of produce of market gardens, $8,700; of forest products, $800; of home manufactures, $56,891; of animals slaughtered or sold for slaughter, $172,382; of all live stock, $2,149,814. The productions were 543,487 bushels of spring wheat, 14,986 of winter wheat, 1,312 of rye, 95,557 of Indian corn, 65,650 of oats, 49,117 of barley, 178 of buckwheat, 9,291 of peas and beans, 323,645 of Irish potatoes, 163 of sweet potatoes, 5 of grass seed, 22 bales of cotton, 109,018 lbs. of wool, 310,335 of butter, 69,603 of cheese, 322 of hops, 10 of flax, 13 of wax, 575 of honey, 3,131 gallons of wine, 67,446 of sorghum molasses, and 27,305 tons of hay. The live stock on farms consisted of 11,068 horses, 2,879 mules and asses, 17,563 milch cows, 3,479 working oxen, 18,138 other cattle, 59,672 sheep, and 3,150 swine; besides which there were 3,213 horses and 151,754 cattle not on farms. The number of manufacturing establishments was 533, having 21 steam engines of 331 horse power, and 192 water wheels of 2,169 horse power; number of hands employed, 1,534; amount of capital invested, $1,391,898; wages paid during the year, $395,365; value of materials used, $1,238,252; annual value of products, $2,343,019. The principal establishments were 74 flouring and grist mills, value of products $782,846; 95 saw mills, $661,431; and 6 woollen factories, $133,620. The number of acres of land under cultivation in 1875 was reported at 347,750; bushels of wheat raised, 2,775,000; barley, 397,500; oats, 589,000; Indian corn, 300,000; potatoes, 1,807,000; tons of hay, 175,000; pounds of wool, 1,000,000; value of all agricultural products, $8,236,022; of manufactures, $2,803,985, nearly half flour. The value of imports into the territory, chiefly merchandise and manufactured articles, was $9,150,851; of exports therefrom, mineral and agricultural products, $6,435,858.—Utah communicates on the one hand with California and on the other with the east by the Central and Union Pacific railroads, which meet at Ogden in the north. From this point the Utah Central railroad extends to Salt Lake City, whence the Utah Southern runs S. to York and the Utah Western W. to Lake Point. The Utah Northern railroad extends from Ogden to Franklin, Idaho; the American Fork railroad, from American Fork on the Utah Southern E. to Deer Creek; the Bingham Cañon railroad, from Sandy on the Utah Southern to Bingham Cañon; the Wahsatch and Jordan Valley railroad, from Sandy to Fairfield; and the Summit County railroad, from Echo on the Union Pacific to Coalville. The following table gives the mileage of railroad in the territory in 1876:

LINES.	Miles in operation.
American Fork	16
Bingham Cañon	20
Central and Union Pacific	226
Summit County	8
Utah Central	37
Utah Northern	80
Utah Southern	78
Utah Western	25
Wahsatch and Jordan Valley	10
Total	500

There are two national banks, with a joint capital of $300,000.—The chief executive officers are a governor and secretary, appointed by the president with the consent of the senate for four years, and an auditor, treasurer, and superintendent of common schools, elected by the territorial legislature for two years. The legislature consists of a council of 13 and a house of representatives of 26 members, elected by the people by districts for two years, and has biennial sessions. The judicial power is vested in a supreme court, consisting of a chief justice and two associates; a district court in each of the three districts into which the territory is divided, held by a justice of the supreme court; and a probate court in each organized county. The justices of the supreme court are appointed by the president for four years; the probate judges are elected for two years. The supreme court has only appellate powers; the district courts are the tribunals of general original jurisdiction. While the government is thus similar to that of the other territories, the influence of the Mormon church is really paramount. By a territorial act of 1870 the right of suffrage was extended to women. The valuation of property, according to the United States census, has been:

YEARS.	ASSESSED VALUE.			True value of real and personal estate.
	Real estate.	Personal estate.	Total.	
1850.......	....	....	....	$986,083
1860.......	$286,504	$3,871,516	$4,158,020	5,596,118
1870.......	7,047,881	5,517,961	12,565,842	16,159,995

The taxation in 1870 was $167,355, of which $39,402 was territorial, $80,419 county, and $47,534 town, city, &c. The assessed value of property in 1875 was $23,289,180, and the territorial tax $58,222 95. The amount in the territorial treasury on Jan. 1, 1874, was $35,655 47; receipts during the following two years, $104,539 23; total, $140,194 70; disbursements during the same period, $139,662 46; balance, Jan. 1, 1876, $532 24.—The common schools are under the management of the territorial superintendent, county superintendents, and district trustees. A superintendent is elected in each county by the qualified voters for two years, and in each school district three trustees are elected for the same period by the resident taxpayers. Some money is raised by taxation, but the expenses of the schools are mainly defrayed by tuition fees. The following statistics are for 1875: number of districts, 236; number reporting, 163; schools, 296; children of school age (4 to 16), 35,696; pupils enrolled in public schools, 19,278; in private schools, 3,542; average attendance, public 13,462, private 2,437; amount paid public teachers, $95,533; paid for building purposes, $49,569; appropriated by territory, $15,000; raised by local taxation, $20,267; tuition fees, $95,533; value of public school property, $438,665. The university of Deseret, at Salt Lake City, was organized in 1869; it has medical, collegiate, normal, and inferior departments. It receives an annual appropriation from the territorial treasury of from $5,000 to $10,000. There are several good schools at Salt Lake City and one or two other points, maintained by various religious denominations. According to the census of 1870, there were 10 newspapers, issuing 1,578,400 copies annually, and having a circulation of 14,250. Of these 3 were daily, 3 semi-weekly, 3 weekly, and 1 monthly. The number of libraries was 133, with an aggregate of 39,177 volumes, of which 59, with 7,684 volumes, were private. There were 165 church organizations, with 164 edifices, 86,110 sittings, and property to the value of $674,600. Of the organizations only 5 were non-Mormon (2 Episcopal, 2 Methodist, and 1 Presbyterian).—Utah forms part of the territory acquired from Mexico in 1848. It was settled in 1847 by Mormons under the lead of Brigham Young. In March, 1849, a provisional government for the "state of Deseret" was organized, which was superseded by the territory of Utah, organized under the act of congress of Sept. 9, 1850, comprising 220,196 sq. m., and embracing portions of what is now Colorado, Wyoming, and Nevada. In 1856, under an act of the territorial legislature, a constitution was framed for the "state of Deseret," and application has since been repeatedly made to congress for its admission into the Union. (See MORMONS, and supplement.)

UTAH, a central county of Utah, containing Utah lake, and bordering E. on the Wahsatch mountains; area, about 1,000 sq. m.; pop. in 1870, 12,203. It comprises the finest portion of the territory; the soil is generally fertile and well cultivated. There are valuable gold mines. It is traversed by the Utah Southern and American Fork railroads. The chief productions in 1870 were 128,909 bushels of wheat, 31,123 of Indian corn, 18,824 of oats, 16,599 of barley, 75,069 of potatoes, 20,323 lbs. of wool, 63,624 of butter, and 7,051 tons of hay. There were 1,945 horses, 805 mules and asses, 6,464 cattle, 11,435 sheep, and 1,047 swine; 16 manufactories of sorghum molasses, 2 flour mills, and 12 saw mills. Capital, Provo.

UTAHS, or **Utes**, a large tribe of American Indians belonging to the Shoshone family, and roaming over a great part of New Mexico, Utah, Colorado, and Nevada. They are hunter tribes, hardy, athletic, and brave where game abounds; but some bands in sterile parts, where there are only sage rabbits, roots, seeds, &c., are wretchedly poor. The men wear long braided cues, while the hair of the women is short. Most of the work is done by women, and the Indians in some bands sell their wives and children to neighboring tribes. They are filthy in their habits, and their arms range from the original club, bow, and lance to good rifles. The principal bands of late years, for they vary, are the Tabequache, Muache, Capote, Weeminuche, Yampa, Grand River, and Uintah bands in Colorado and New Mexico; the Pi Edes, Pi Utes, Elk mountain Utes, and Shebe Ucher in the south and east of Utah; and the Weber Utes, Timpanagos, Sanpitches, Pahvants, and Goshutes in other parts of that territory. They have generally been friendly to the whites, though at times some bands have plundered emigrants on the plains. The bands in Utah were at first friendly to the Mormons, but after an attack by Walker's bands a body of volunteers defeated them, killing and taking many. A treaty was made with the Capotes in 1855, but some bands became hostile again. The Mohuaches declined to join the Mormons against the United States, but there was some fighting between the Utes and the miners at Pike's peak, and Winnemucca defeated Maj. Ormsby on Truckee river in a well fought battle. By a treaty made June 8, 1865, some of the bands ceded all their lands, the largest concession ever made by a tribe, and agreed to go on reservations; but a bad spirit soon became manifest. Black Hawk, a chief of the Pah Utes, for several years carried on a bloody warfare. Sanpitch, chief of the tribe so called, was arrested for aiding Black Hawk, and killed in endeavoring to escape; and in October, 1866, Col. Alexander defeated Ankotash, a Mohuache chief, killing many. In 1866 a treaty was made with the Grand River Utes and Tabequaches, to secure roads, &c. The reservation plan was carried out with so little judgment, that great suffering and general demoralization resulted. The treaty of 1865 guaranteed them $25,000 a year for 10 years, $20,000 for 20 years, and $15,000 for 30 years. The Goship Utes have $1,000 a year for 20 years under treaty of Oct. 12, 1863. It was found that valuable mines existed on the Ute reservation in Colorado, and under the act of April 23, 1872, for reducing the reservation, the secretary of the interior was authorized to contract with the tribe for a part of it. The Indians on the reservation, Tabequaches, Muaches, Capotes, Weeminuches, Yampas, Grand Rivers, and Uintahs, at last consented; and they ceded 4,000,000 acres for $25,000 a year for ever. Very soon however Miller, one of the Indian agents, was killed by two Utes, and this with theft of stock by the Capotes led to a collision between them and the troops. A careful census of the whole tribe in 1874 gave in Utah 8 bands of Pi Utes, numbering 528; 3 bands in northern Arizona, 284; 15 in southern Nevada, 1,031; 5 in S. E. California, 184; the Uintahs, Sanpitches, Timpanagos, and 4 other bands of Utes on the Uintah reservation, 556; the Pahvants of Utah, 134; and the Goshutes of Utah and Nevada, 460; 300 Chemehueves in California, who belong really to the Utes; the Pah Utes at Walker river, 6,000; at Southeast agency, 3,000; the Tabequaches, Capotes, Muaches, and Weeminuches, 3,199; and Peah's band, 350. Their property is chiefly in horses.

UTICA, an ancient city of Africa, on the W. arm of the river Bagradas, near the bay of Carthage, a short distance N. W. of the present city of Tunis; its site is now occupied by the little village of Bu-shatter. It is said to have been founded by the Tyrians 287 years before the foundation of Carthage. In the early wars between Rome and Carthage it appears as an ally of the latter. In the third Punic war it made a separate and early submission to Rome, and its prosperity was thereby greatly increased, as on the fall of Carthage a part of its territory was given to Utica, and that city was made the residence of the Roman governor. In the historical narratives of the struggles between Sulla and Marius, and those between Cæsar and Pompey, frequent references are made to it as a place of great importance. Its amphitheatre was capable of seating 20,000 persons, and on an artificial lake mimic sea fights were exhibited. Its supplies of water were stored in numerous vast reservoirs or cisterns, some of which still remaining are 136 ft. long, 19 ft. wide, and 20 or 30 ft. deep. Cato the younger, surnamed Uticensis, committed suicide here in 46 B. C. Augustus made Utica a free city. It was the see of a Christian bishop at an early date. It fell into the hands of the Vandals in 439, but was recovered by the Byzantine emperors, who retained it till toward the close of the 7th century, when it was conquered by the Arabs and destroyed.

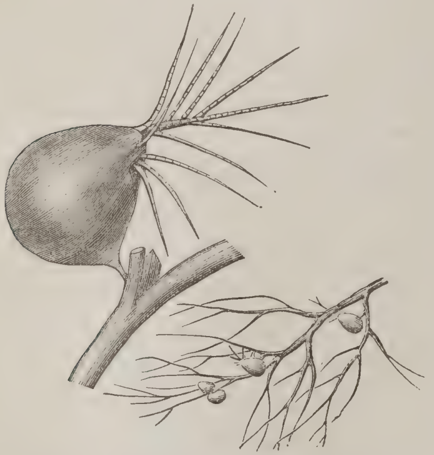
UTICA, a city and one of the county seats of Oneida co., New York, on the S. bank of the Mohawk river, at the junction of the Erie and Chenango canals, 83 m. (direct) W. N. W. of Albany and 45 m. E. of Syracuse; pop. in 1850, 17,565; in 1860, 22,529; in 1870, 28,804, of whom 9,849 were foreigners; in 1875, 32,070. The city is regularly laid out, and rises gradually from the river to the height of 150 ft. at the head of Genesee street, which has the principal shops and many elegant residences. The city hall on this street, erected about 1852, is of Milwaukee brick, and contains besides the city offices a court room for the United States courts, which hold a term here annually, and a commodious public hall. The city is lighted with gas, and is well supplied with water. It is at the intersection of the New York Central, the Utica and Black River, the Delaware, Lackawanna, and Western, and the New York and Oswego Midland railroads. Its trade in cheese is extensive. The manufactures amount to about $8,000,000 annually, embracing engines and boilers, machinery, iron and brass castings, pig iron, carriages, furniture, ale, organs, stone ware, fire brick, carpets, oil cloth, millstones, boots and shoes, cement, gloves, knit goods, lime, lasts, stained glass, agricultural implements, pumps, saws, rope, spring beds, silver ware, steam gauges, varnish, and japan. There are four national banks, with an aggregate capital of $1,500,000, a state bank, two private banks, and a savings institution. Utica is divided into ten wards, and is governed by a mayor and a board of aldermen of two members from each ward. It is the seat of one of the state lunatic asylums, which occupies a farm of 130 acres, with buildings that cost upward of $500,000. The other charitable institutions include the Faxton hospital, home for the homeless, industrial home for women, house of the Good Shepherd, St. John's orphan asylum, St. Elizabeth's hospital and home, St. Luke's home and hospital, St. Vincent's orphan asylum, St. Vincent protectorate, Utica dispensary, and Utica orphan asylum. The city has 17 public schools, including the free academy, with an average daily attendance of about 3,000 pupils, and 12 or 15 private schools and academies. The city library contains 6,055 volumes. Two daily, one tri-weekly (German), and five weekly (one Welsh) newspapers, and a quarterly ("American Journal of Insanity") and three monthly periodicals are published. There are 34 churches, viz.: 4 Baptist, 5 Episcopal, 1 Evangelical Association, 2 Evangelical Lutheran, 1 German Moravian, 1 Jewish, 6 Methodist, 5 Presbyterian, 1 Reformed, 5 Roman Catholic, 1 Universalist, 1 Welsh Calvinistic Methodist, and 1 Welsh Congregational.—The site of the city was included in the colonial grant styled Cosby's manor, made in 1734; but there was no settlement till after the revolution. Fort Schuyler was erected between the present Main and Mohawk streets, below Second street, in 1758, and a blockhouse was built before the close of the revolutionary war near the site of the present railroad depot. Till 1798 the village was called Old Fort Schuyler. In 1813 it had 1,700 inhabitants, and it grew very slowly till after the completion of the Erie canal. It received a city charter in 1832.

UTOPIA (Gr. *οὔ*, not, and *τόπος*, a place), the title of a political romance by Sir Thomas More, and the name that he gave to an imaginary island, which he represents to have been discovered by a companion of Amerigo Vespucci, and in which existed a perfect society. He pictured a community where all the property belonged to the government, to which every one contributed by his labor, receiving therefrom a supply of his wants; where the citizen rose through all the gradations of his existence from form to form, as if in a vast public school; where gold was contemned, and all the members of the society, unswerved by passion, were fixed each in his proper place. "Utopia" was published in Latin in 1516, and translated into English by Bishop Burnet.

UTRAQUISTS. See CALIXTINES.

UTRECHT. I. A province of the Netherlands, bounded N. by North Holland and the Zuyder Zee, E. by Gelderland, S. by Gelderland and South Holland, and W. by South Holland; area, 534 sq. m.; pop. in 1873, 179,465. The surface is level in the north and west, and varied in the southeast by low hills. It is well watered by the Rhine, and its branches the Vecht and Amstel. The air is less damp than in other parts of the Netherlands, and the climate is generally healthful. In the elevated parts the soil is sandy, and covered by extensive heaths and tracts of peat moors, but the low grounds are rich and fertile. **II.** A city, capital of the province, on the Crooked Rhine, which here divides into the Vecht and the Old Rhine, the principal branch assuming the latter name, 20 m. S. E. of Amsterdam; pop. in 1875, 64,275, about one third Roman Catholics. It is surrounded by forts, but the old ramparts are now used as boulevards. The mall, in the E. part of the city, is an exceedingly fine promenade. There are several canals and attractive squares, and many families of the Dutch aristocracy reside here. It has more than 20 churches, besides three cathedrals. Of the latter, the Reformed St. Martin's is the most remarkable for its fine Gothic architecture, and has seven chapels filled with monuments. Part of it was destroyed by a hurricane in 1674, and the tower is still detached from the main building. The government offices are in the so-called pope's house, built by Pope Adrian VI., who was born here (1459), in a house still standing. The once celebrated St. Paul's abbey is used for courts of law. Among other notable buildings are the national mint, a palace for arts and sciences, one formerly inhabited by King Louis Bonaparte, the renovated town hall, a large military hospital established by Napoleon I., and the William's barracks. The university, dating from 1636, is attended by about 500 students; among its adjuncts are a new physiological museum, a botanic garden, and a large library. Cigars, cotton, silk, linen, woollen cloth, carpets, and plush (Utrecht velvet) are made, and there are many publishing houses. Drinking water is shipped to Amsterdam. The city is the seat of a Roman Catholic archbishop and the old headquarters of the Jansenists, whose resident archbishop and whole congregation of 5,000 members joined the Old Catholics in 1874.—Utrecht is the oldest of all Batavian cities. The Romans called it Trajectum ad Rhenum and Ultrajectum; from the latter the modern name is derived. It belonged successively to the Frankish dominions and the German empire, and the union which laid the foundation of the republic of the seven United Provinces was organized here in 1579. The treaty of Utrecht, signed April 11, 1713, after long conferences, by the representatives of France, Great Britain, Holland, Prussia, Portugal, and Savoy, and subsequently completed by the peace of Rastadt (1714) and other treaties, formed an important era by ending the Spanish war of succession. By it Philip V., grandson of Louis XIV., was acknowledged as king of Spain; the Spanish Netherlands, Naples, Milan, and the island of Sardinia were left in the possession of the emperor Charles VI.; Sicily was given to Victor Amadeus II. of Savoy; and England obtained Gibraltar, Minorca, the Hudson Bay territories, Newfoundland, and Acadia, besides the recognition of the Protestant succession. (See *Le traité d'Utrecht*, by Charles Giraud, Paris, 1847.)

UTRICULARIA (Lat. *utriculus*, a little bladder), the bladderwort, a genus of aquatic or marsh plants, of which there are more than 100 species, some of which are found in nearly all parts of the world, there being over a dozen in the United States. The genus, with *pinguicula* and one other little known genus, forms what most botanists call the family *lentibulaceæ* (from *lentibula*, an old name for one species), but Hooker in his edition of Maout and Decaisne ("General System of Botany") gives the family the more appropriate name *utriculariea;* its affinities as to the structure of the flowers are with the figworts (*scrophulariaceæ*), and that of the fruit with the primroses (*primulaceæ*). A few of our species are found rooting in the muddy or sandy margins of ponds; these have minute awl-shaped leaves, and a slender stem bearing a solitary flower or a few flowers. The majority of them are floating aquatics, and are usually without roots; their branching stems are furnished with leaves divided into fine, capillary segments, bearing numerous small bladders, which at flowering time enable the plant to float near the surface and throw up its naked stems, which bear a few yellow or purplish flowers. The calyx is two-lipped; the monopetalous corolla two-lipped with a projecting palate, which often closes the throat; stamens two, with one-celled anthers; pistil with a one-celled free ovary, ripening into a several-seeded capsule.—The bladderworts have long been favorite plants with botanists, on account of their peculiar structure and the rarity of some of the species, but of late they have been invested with new interest from the fact that they must now be classed, with the closely related *pinguicula*, among insectivorous plants. It had been observed that the little bladders, which form such a striking feature of the floating species, contained minute crustaceans and other microscopic animals, and that their use was not solely, as had been supposed, to enable the plant to float and lift its flowers above the water. These hints induced Darwin to investigate the matter, and the results form two important chapters in his "Insectivorous Plants" (1875). About the same time Mrs. Mary Treat of Vineland, N. J., investigated the subject, and though most of her observations (published in the "New York Tribune," January, 1875) were anticipated by Darwin, she noticed some points that escaped him, which he quotes in the work referred to. Darwin's observations were made upon *U. neglecta*, which English botanists now regard as a subspecies of *U. vulgaris*, our most abundant bladderwort. The structure and action of the bladders require several pages and engravings for a full explanation. The bladders, of which there are two or three on the same divided leaf, are about one tenth of an inch across, and usually filled with water, though often containing bubbles of air; they are attached to the leaf by a short stalk, and, as shown by the enlarged engraving, are of a one-sided egg-shape. The mouth or opening usually points downward, and on the upper side terminates in two long appendages, each of which bears six or seven long bristles; these appendages, of which that on the near side only is shown in the engraving, Darwin terms antennæ; beneath these is the opening, with several other bristles on each side of it, and this is closed by a valve so arranged that it can only open inward; this valve is furnished with numerous glands, and the whole interior of the bladder is studded with processes, consisting of four unequal arms, which he calls quadrifid processes. The valve yields to a slight exterior pressure, the structure of the bladder being that of an admirably contrived trap for capturing microscopic creatures; and that it performs this office most effectively, the presence of animals or their remains in nine out of ten of the bladders is a proof. These creatures have been repeatedly seen by Mrs. Treat to enter the bladder, and she noted the time they remained alive after their capture; in most cases the before clear and transparent bladder became in less than two days so muddy from the decomposition of the animals that the contents could not be seen. Darwin has satisfied himself by experiments, given at length in the work referred to, that the utricularias capture these animals for nutriment.


Utricularia. Small branch with divided leaves and bladders, enlarged twice; a single bladder, greatly enlarged.

Common Bladderwort (Utricularia vulgaris).

UVALDE, a S. W. county of Texas, drained by the Rio Frio and its affluents; area, 1,000 sq. m.; pop. in 1870, 851, of whom 73 were colored. It has great advantages for stock raising, but is not well adapted to agriculture on account of the dryness of the seasons. The chief productions in 1870 were 18,225 bushels of Indian corn, 1,820 of sweet potatoes, 5,550 lbs. of butter, and 4,800 of wool. There were 162 horses, 24,778 cattle, 4,930 sheep, and 1,378 swine. Capital, Uvalde.

UVAROFF, Sergei Semenovitch, count, a Russian statesman, born in Moscow in 1785, died there in September, 1855. He studied in Göttingen, and was successively curator of the university of St. Petersburg and president of the academy of sciences, director of the department of trade and industry, and minister of education. He was made a count in 1846, and retired in 1848 on account of the restrictions on public instruction, which he had much promoted. More than any other Russian statesman he called into existence learned institutions, and laid the foundation of oriental studies and of the Asiatic department in the chancellery. His works have been collectively published under the titles of *Études de philologie et de critique* (St. Petersburg, 1843) and *Esquisses politiques et littéraires* (Paris, 1849), including his *Notice sur Gœthe.*

UVULA, a conical fleshy appendage, hanging down toward the tongue from the border of the soft palate, on the median line. It is made up of muscular substance, covered by mucous membrane; from it arise on each side two folds, called the pillars of the fauces, between which, on the back part and sides of the throat, are the tonsils. It varies in size and length in different individuals, but is generally one half to three quarters of an inch long; it is sometimes so long as to rest upon the tongue, causing harassing cough from its continued tickling, requiring the use of astringent gargles or even a partial excision. Its function is supposed to be that of affording, by the contraction of its muscular fibres, a firm point of support upon the median line to the lateral muscles of the soft palate when this organ is stretched across the upper part of the pharynx in deglutition, shutting off the communication between the pharynx and the posterior nares.

UWINS, Thomas, an English painter, born in London in 1783, died at Staines, Middlesex, Aug. 25, 1857. In early life he designed for illustrated works, and prepared copies for engravers. Subsequent to 1826 he painted a popular series of pictures illustrating the social life of the Italian peasantry. He also painted English and French peasant pieces and illustrations from sacred and profane history. In 1836 he was elected a royal academician; and for several years he was keeper of her majesty's pictures and of the national gallery.

UZBECKS, a people of Turkistan, belonging to the Turkish or Tartaric branch of the Turanian race, of which they are the most civilized tribe in that country, and constituting the dominant native population in Khiva, Bokhara, and Khokan. The typical Tartar characteristics of the Kirghiz are modified in the Uzbecks, probably by the introduction of an Aryan element. They are tall, muscular, and well formed, ruddy in complexion, with broad noses flattened at the end, receding foreheads, and but little beard. Although many of the Uzbecks still live as nomads, the larger number belong to the class known as Sarts or settled inhabitants of Turkistan, and dwell in or about the principal towns, where their military, official, and social influence has induced many persons of different race to assume their name. The population, according to a Russian estimate, numbers 1,500,000 persons. In the time of Timour, about the end of the 14th century, the Uzbecks dwelt N. of the Jaxartes, whence they subsequently overran Bokhara. The purest specimens of the people are met with in Khokan. They are bigoted Mohammedans.

UZZIAH, or Azariah, a king of Judah. See HEBREWS, vol. viii., p. 588.

V

V, THE 22d letter and 17th consonant of the English alphabet. It was anciently called U consonant. Though found on the most ancient Roman monuments of which we have any knowledge, and even in Etruscan and Samnite inscriptions, it was unknown, according to Tacitus, to the primitive alphabet of the Latins. The same character was used to represent both U and V, these letters also being frequently interchanged (see U); and when the emperor Claudius, as Suetonius relates, wished to introduce a separate sign for the sound of V, he made choice of the inverted digamma, Ⅎ. In the inscriptions of the Etruscans and other primitive inhabitants of Italy, V is frequently confounded with the Æolian digamma, Ϝ, through which it claims relationship with the Semitic *vav.* Among the Hebrews, too, and probably also among the Phœnicians, the corresponding letter was employed both as consonant and vowel. The present form of V is derived from the Greek *upsilon* (Υ), which is sometimes represented without the stem or vertical bar.—Besides *u,* this letter is interchanged with *b, f,* and *m.* The Hebrew *beth* sometimes had a sound approaching that of V, and the Greek *beta* (β) is pronounced by the modern Greeks *vita.* The Spanish and Portuguese B, too, is in many cases pronounced like V. In German V is pronounced like F. (See B, and F.) The change with *m* is noticed chiefly in Welsh, in which tongue *Roman* becomes *Rofan* (pronounced Rovan), while for the Latin *amnis,* river, the Welsh equivalent is *Afon.*—V as a numeral denotes 5, or with a dash over it ($\overline{V}$), 500. On old French coins it signifies the mint of Troyes.

VACA, Cabeça de. See NUÑEZ, ALVAR.

VACCAJ, Nicolò, an Italian composer, born at Tolentino in the Papal States in 1791, died in Milan in 1849. He was a pupil of Paisiello at Naples, and from 1811 to 1820 wrote operas, cantatas, and ballets, which had a moderate success. He then taught singing in Venice, Trieste, and Vienna, and wrote *Pietro il Grande*, a comic opera performed at Parma, *Zadig ed Astartea*, performed at Naples, and *Giulietta e Romeo*, performed at Milan, his best work. He afterward taught singing in Paris and London, but returned to Italy in 1832, and in 1838 became first master of composition at the conservatory of Milan, which post he held till his death.

VACCARO, Andrea, an Italian painter, born in Naples in 1598, died there in 1670. He was a pupil of Stanzioni, after whose death he was at the head of the Neapolitan school. One of his best works is a "Holy Family" in the church of Santa Maria degli Angeli at Naples.

VACCINATION (Lat. *vacca*, a cow), inoculation for cowpox as a protection against smallpox, first practised by Dr. Edward Jenner in 1796. (See JENNER.) On the 2d or 3d day after virus taken from a perfect vaccine vesicle, whether from the cow or the human subject, is placed in contact with the denuded dermis or true skin, the puncture is observed to be slightly inflamed. On the 4th or 5th day a vesicle is observed surrounded by a slight blush of inflammation, and containing a little colorless, transparent fluid. This increases until the 8th day, when it should be from a quarter to half an inch in diameter, the blush of inflammation surrounding it at the same time having become more marked. The vesicle is umbilicated, that is, its centre is depressed below the level of the circumference, in this respect resembling the pustules of smallpox. It is compound, being made of 10 to 14 distinct cells; one of these, carefully punctured, discharges a minute drop of fluid, leaving the other cells still distended. On the 8th day the blush of surrounding inflammation, heretofore very slight, begins to extend, forming what is termed the areola; it attains its greatest diameter by the 11th day, after which it gradually fades and disappears. With the appearance of the areola the vesicle becomes darker and dryer, and gradually concretes into a brown translucent crust, which falls off about the 20th day, leaving a circular depressed cicatrix. About the 8th or 9th day there is usually some slight febrile disturbance, though it is often scarcely noticeable. Such is the course of the true vaccine vesicle when uninterfered with, either by the presence of constitutional disease or by the accidental occurrence of inflammation.—When vaccination was first introduced, it was believed that it would afford in all cases complete and permanent protection from smallpox. But it was discovered that those who had been well and thoroughly vaccinated were still liable to some extent to attacks of smallpox; and though in general the disease was modified (varioloid) and rendered shorter and milder, still it occasionally resulted in death. The degree of protection afforded by vaccination thus became a question of great interest. Its extreme value was easily demonstrated by statistical researches. In England, in the last half of the 18th century, out of every 1,000 deaths, 96 occurred from smallpox; in the first half of the present century, out of every 1,000 deaths, but 35 were caused by that disease. The amount of mortality in a country by smallpox seems to bear a fixed relation to the extent to which vaccination is carried out. In all England and Wales, for some years previous to 1853, the proportional mortality by smallpox was 21·9 to 1,000 deaths from all causes; in London it was but 16 to 1,000; in Ireland, where vaccination was much less general, it was 49 to 1,000, while in Connaught it was 60 to 1,000. On the other hand, in a number of European countries where vaccination was more or less compulsory, the proportionate number of deaths from smallpox about the same time varied from 2 per 1,000 of all causes in Bohemia, Lombardy, Venice, and Sweden, to 8·33 per 1,000 in Saxony. Although in many instances persons who had been vaccinated were attacked with smallpox in a more or less modified form, it was noticed that the persons so attacked had been commonly vaccinated many years previously. The mere lapse of time in many cases seems sufficient to destroy the protective influence of vaccination. The duration of the protective influence varies with different individuals. The same thing happens with regard to the protective influence of an attack of smallpox itself; in most persons it lasts for life; many, after a period more or less prolonged, are liable to a second attack; while cases have occurred in which a third attack has proved fatal. In all cases revaccination seems to be a test of the loss or presence of the protective influence; to render this test certain, where revaccination does not succeed on the first trial, it should be carefully performed a second time. In the Prussian army in 1848, 28,859 individuals were revaccinated, in 6,373 of whom the cicatrices of the preceding vaccination were indistinct or invisible. Of these, 16,862 had regular vesicles, 4,404 irregular vesicles, and in 7,753 cases no effect was produced. On a repetition of the vaccination in these last, it succeeded in 1,579 cases. Among the whole number successfully revaccinated either in 1848 or before, there was but a single case of varioloid, and not one case of smallpox; while seven cases of varioloid occurred either among the recruits or among those revaccinated without success.

VACHEROT, Étienne, a French philosopher, born in Langres, July 29, 1809. He studied at the normal school in Paris, and was director of studies there from 1837 to 1851, when he was suspended through ultramontane influence. In 1852 he was dismissed for refusing to take the oath to Napoleon III.; and for his treatise *La démocratie* (1859) he underwent three months' imprisonment, and for this and his refusal to act as a member of the council of superior instruction was disfranchised till 1870. In 1871 he was elected a member of the national assembly. He succeeded Cousin in the academy. His works include *Histoire critique de l'école d'Alexandrie*, crowned by the academy (3 vols., 1846-'51); *La métaphysique et la science* (2 vols., 1858; 2d ed., 3 vols., 1863); *Essais de philosophie critique* (1864); and *La religion* (1868).

VAGA, Perino del, or **Pietro Buonaccorsi**, an Italian painter, born in Florence in 1500, died in Rome in 1547. He adopted the names of his teachers Vaga and Perino, and was employed by Raphael on some of the principal designs in fresco for the Vatican. After the death of Raphael he rose into great reputation. In 1527, during the sack of Rome, he was imprisoned; and on being ransomed he went to Genoa, where he embellished the palace of the Dorias. He returned to Rome during the pontificate of Paul III. He designed after the style of Michel Angelo, and excelled in mythological, classical, and religious subjects. His best work is the "Creation of Eve" in Rome.

VAGRANT (Lat. *vagari*, to wander), in law, sometimes defined as one who has no settled home, but more properly one who wanders about without any settled home, refuses to work, and has no means of subsistence. The law looks upon vagrancy as an offence, not for its moral wrong nor for the harm it does to the man himself, but for its injury to society, and the demand it makes upon the means of society for the subsistence of the vagrant. If one having a settled home, without means of subsistence, requires help, he is a pauper, and not a vagrant; that is, he is entitled to aid, but is not an offender. Neither is one a vagrant who, having means of his own, leads a life of idle wandering, but makes no call upon the public means, and inflicts no direct injury upon the public welfare. Vagrancy has been a statutory offence from a very early day, and it was probably an offence at the common law.

VAILLANT, François Le. See LE VAILLANT.

VALAIS (Ger. *Wallis*), a S. W. canton of Switzerland, bounded N. by Vaud and Bern, E. by Uri and Ticino, S. E. and S. by Piedmont, and S. W. and S. by Savoy; area, 2,026 sq. m.; pop. in 1870, 96,887, nearly all Roman Catholics. Valais is one of the most picturesque of Swiss cantons, being surrounded on all sides by some of the loftiest mountains, such as the Monte Rosa group (highest peak, 15,150 ft.) and the Matterhorn (14,835 ft.), both belonging to the Pennine Alps and separating Valais from Italy; and besides other branches of these Alps S. and W., there are those of the Helvetian or Lepontine Alps on the east, and their divergent branch known as the Bernese Alps on the north. Among over 100 glaciers in this canton, which are best seen from the valleys descending into it from Monte Rosa, are several of great extent and magnificence, especially the Gorner ice stream and the Viescher glacier, forming an ice cataract, and the Aletsch, the largest of all the glaciers, separated by a ridge from the Eggischhorn, one of the present headquarters of high Alpine explorations. The Sallenche waterfall adjoins Martigny, the starting point of the roads over the Great St. Bernard and Col de Balme passes. The new road over the Furca pass, completed in 1867, directly connects the St. Gothard group with the valley of the Rhône, the principal valley in this canton, and has greatly increased the traffic across the Alps from Upper Valais. Several other great and minor passes, such as the Grimsel near the Rhône glacier, the Gemmi near the mineral springs of Leuk, and others, are in part or wholly in this canton. The chief occupation is the rearing of cattle, in connection with dairies. Grapes and figs ripen at the foot of ice-clad mountains, and wine is produced in the central and lower parts of the canton. The crops of maize have lately increased, as well as the mineral productions. Emigration to the United States has much increased since 1868. The country is generally divided into Upper and Lower Valais. French, in a corrupt form, is spoken by a majority of the inhabitants.—Valais was long ruled by Bern; it became a separate canton under the Helvetic constitution of 1798, was subsequently annexed to France, and after the fall of Napoleon was again admitted as a canton. It joined in the movement which led to the formation of the Sonderbund in 1843, and after its overthrow in 1847 adopted a liberal constitution, which was modified in 1852 through the ultramontane influence of Upper Valais. The grand council consists of 85, and the council of state of 7 members, the former initiating laws and the latter carrying them out. The Roman Catholic bishop resides at Sion or Sitten, the capital.

VALCKENAER. I. Lodewijk Casper, a Dutch scholar, born in Leeuwarden in 1715, died in Leyden, March 14, 1785. He became professor of Greek at Franeker in 1741, and also of Grecian antiquity in 1755, and from 1766 held those two chairs together with that of Dutch history at Leyden. He edited the works of several of the classical authors, and wrote a number of critical and other treatises, a collection of which was published by Erfurdt under the title *Opuscula Philologica, Critica et Oratoria* (2 vols. 8vo, Leipsic, 1809). **II. Jan**, a Dutch statesman, son of the preceding, born in Leyden about 1759, died in Haarlem, Jan. 25, 1821. He was professor of jurisprudence successively at Franeker and Utrecht, but, being an active leader of the anti-Orange party, was compelled to leave Holland in 1787. After soliciting the coöperation of France, he accompanied the French auxiliary troops under Pichegru to the Netherlands in 1794–'5, and became a member of the legislative body of the new republic and professor of public law at Leyden. In 1796 he went as ambassador to Spain. In 1810 he attempted in vain, as an envoy of King Louis Bonaparte, to dissuade Napoleon from annexing Holland to France.

VALDEZ. See MELENDEZ VALDEZ.

VALDIVIA. **I.** A S. province of Chili, bordering on the province of Arauco, the Andes (which separate it from the Argentine Republic and Patagonia), Llanquihue, and the Pacific ocean; area, 10,700 sq. m.; pop. in 1875, 37,481. There are many fine harbors on the coast. On the E. border are several active volcanoes, of which Villarica is the highest. The surface between the sea and the Andes is generally more level than that of other parts of Chili. The most important streams are the Cauten or Imperial, Tolten, Valdivia, and Rio Bueno. The soil is exceedingly fertile, and the greater part is covered with forests of excellent timber. The climate is moist, but healthful. Valdivia at one time yielded large quantities of gold, but the system of slavery which the Spaniards attempted to impose upon the natives caused a revolt, which led to the ruin of the mines. About two thirds of the population are Araucanian Indians, and the remainder descendants of the Spaniards and mixed breeds. **II.** A city, capital of the province, on the S. side of the Valdivia river, about 9 m. from the Pacific, and about 470 m. S. of Santiago; lat. 39° 49′ S., lon. 73° 15′ W.; pop. in 1875, 4,054, many of whom are Germans. The harbor, a beautiful bay formed by the river, is one of the best on the Pacific. The island of Manzera at the entrance to the river forms two passages, skirted by steep mountains strongly fortified. Its chief trade is with Valparaiso, to which it exports large quantities of timber. It was founded in 1551 by Pedro de Valdivia, became rich and populous, was many times attacked and in 1590 destroyed by the Araucanians, and was rebuilt and strongly fortified. It was taken by the Dutch in 1640, and by the patriots under Lord Cochrane in 1820.

VALENCE (anc. *Valentia*), a town of France, in Dauphiny, capital of the department of Drôme, on the left bank of the Rhône, which is here spanned by an unusually fine suspension bridge, 57 m. S. of Lyons; pop. in 1872, 20,668. The streets are narrow, and old walls surround the town; but there are attractive squares and promenades. It is a bishop's see, and has a cathedral founded in 212 by St. Apollinaris, with a tower rebuilt in 1862, and with Canova's monument of Pope Pius VI., who died here. Connected with the artillery school is a large area for practice. The former citadel is now a barrack for engineers. Silk and cotton goods, gloves, glass ware, and other articles are manufactured. There is much trade in the sparkling St. Peray wine, almost equal to Champagne, and in timber, grained leather, cloth, &c.—The town was a colony in Gallia Narbonensis, and in the middle ages was the capital of the county and duchy of Valentinois.

VALENCIA, a central county of New Mexico, divided into two parts by the S. projection of San Miguel co.; area, about 10,500 sq. m.; pop. in 1870, 9,093. The E. part borders on Texas, and is intersected in the S. W. corner by the Rio Pecos. The W. part, bordering on Arizona, is intersected near the centre by the Rio Grande, and watered by its tributary the Puerco, and by the Zuñi, one of the head streams of the Colorado Chiquito, and is crossed by several mountain chains. The chief productions in 1870 were 39,438 bushels of wheat, 77,854 of Indian corn, 5,755 of peas and beans, 6,178 lbs. of tobacco, and 72,840 of wool. There were 456 horses, 622 mules and asses, 1,264 milch cows, 3,329 working oxen, 48,610 sheep, and 795 swine. Capital, Valencia.

VALENCIA. **I.** An ancient kingdom of Spain, bounded N. by Catalonia, E. and S. E. by the Mediterranean, S. W. by Murcia, W. by New Castile, and N. W. by Aragon; area, 8,897 sq. m.; pop. in 1870, 1,401,833. It comprised the modern provinces of Castellon, Valencia, and Alicante. The principal rivers, all of which rise in the country W. of Valencia, are the Guadalaviar, the Jucar and its tributary the Magro, the Palancia, Mijares, and Segura. The interior parts are mountainous, while the land upon the coast and on the banks of the numerous rivers is generally level. In some places high rugged mountains come close to the sea. The Sierra de Penaquila, which terminates in Cape San Martin, traverses the province of Alicante in a N. E. direction. The other ranges are irregular, but for the most part lie nearly E. and W. The ores of iron, copper, cobalt, quicksilver, lead, and silver are found. Superior facilities for irrigation render Valencia the most fertile district of Spain, and in some places several crops are raised in a year. Wine is produced in large quantities. The climate is noted for its mildness and salubrity.—Under the Moors Valencia formed part of the caliphate of Cordova, but it was taken from them by the Cid in 1094. They reconquered it in 1101, and on the dissolution of the realm of the Almoravides it became an independent kingdom; but the Moors were finally expelled in 1238. It afterward became a province of the kingdom of Aragon, retaining however the title of *reino de Valencia.* **II.** A province occupying the centre of the ancient kingdom, bordering on the Mediterranean and the provinces of Castellon, Teruel, Cuenca, Albacete, and Alicante; area, 4,352 sq. m.; pop. in 1870, 665,141. The rivers Guadalaviar and Jucar, which intersect it, supply a system of irrigating canals, watering more than 100,000 acres. The chief crops of the irrigated lands are wheat, barley, oats, rye, lucerne, maize, beans, hemp, rice, oranges, and mulberries; of the unirrigated lands, the grape, olive, carob, fig, date, and esparto grass. About 4,000 acres are devoted to orange culture, which has become very important. The mountainous districts are clothed with forests of fine timber, and there are valuable marble quarries in the interior and fisheries on the coast. Large numbers of sheep and goats are raised, and the silkworm is extensively cultivated. **III.** A city (anc. *Valentia*), capital of the province and of the ancient kingdom, on the river Guadalaviar, about 2 m. from the sea, 190 m. E. S. E. of Madrid; pop. about 110,000. The old city is surrounded by a circular wall, built in 1356, 30 ft. high and 10 ft. thick, which has eight gates. Its streets are crooked and narrow, and the houses high and gloomy; but the suburbs beyond the walls are handsomely laid out and well built. A quay planted with shade trees extends along the river, which is crossed by five bridges. Among the public buildings are the cathedral, begun in 1262 and enlarged in 1482, the interior of which is richly adorned with marbles and many fine pictures; the episcopal palace, custom house, chamber of commerce, court house, theatre, academy of the fine arts, school of commerce, medical institute, several hospitals and asylums, and many churches and suppressed convents. The university, founded in 1410, has a library of about 45,000 volumes and a museum of natural history, and there is another library of 11,000 volumes in the bishop's palace. The national museum, in one of the suppressed convents, contains several hundred paintings of the Valencian school. The botanic garden has the finest collection of exotic plants in Spain. The fashionable promenade is the Alameda, whose long avenue, adorned with fountains and trees, leads to the Grao or port of Valencia. The harbor is formed by a semicircular curve in the beach, ½ m. in diameter, with two moles extending seaward, one 5,833, the other 3,589 ft. long. An inner port is formed by two arms extending from the moles across the curve, and enclosing an area of 110,000 square yards. It is defended by two batteries of 12 guns each, situated on the shore on each side of the Grao. The principal manufactures of Valencia are silks, linen and woollen goods, bagging and cordage, hats, gloves, fans, combs, leather, glass, paper, painted tiles, soap, iron ware, and pottery. The exports are oranges, nuts, raw silk, wine, esparto, raisins, and saffron. Of these, oranges form the most important item; the export of the crop of 1873–'4 was 523,717 cases, of which Great Britain took 440,859 cases, and the United States 60,964. During the same season 163 steamers engaged in the orange trade loaded in the port. The wine is shipped chiefly to France. The total value of the exports to the United States for the year ending Sept. 30, 1874, was $332,392. About 3,000 vessels, native and foreign, visit the port annually.—Valencia was a town of the Edetani in Hispania Tarraconensis. At a later period it became a Roman colony, in which D. Junius Brutus settled the soldiers of Viriathus about 138 B. C. It was destroyed by Pompey, but was soon restored. The Moors took it from the Goths in 713, and it was captured from them in the spring of 1094, after a siege of 20 months. In 1101 they retook it, but were forced to surrender it in 1238. In the war of the succession Valencia was opposed to the French, in consequence of which it lost its privileges in the reign of Philip V. In June, 1808, the French, under Gen. Moncey, attempted to take it; but though it was abandoned by the generals and nobles, the people, under Rico, a monk, made a gallant defence, and compelled the enemy to retire with great loss. It was afterward (Jan. 9, 1812) surrendered to Suchet by the Spanish general Blake.

VALENCIA, a city of Venezuela, capital of the province of Carabobo, in a valley between the sierras San Diego and Guataparo, 18 m. from Puerto Cabello, its seaport, and 70 m. W. S. W. of Carácas; pop. in 1873, 28,544. In 1810 it was 3 m. W. of Valencia lake, which has so diminished from evaporation that it is now nearly 9 m. distant. The streets are broad and laid out at right angles to each other, but most of the houses are low and mean. There are no public buildings worthy of note, excepting the principal church, which stands in a large square. A brisk trade is carried on through Puerto Cabello, with which it is connected by a good road.—Valencia was founded in 1555. In 1558 it was attacked by Indians, who were repulsed with great loss. It suffered from the earthquake of 1812, and subsequently from the war of independence.

VALENCIENNES (under the Merovingians *Valentianæ*), a town of France, in the department of Le Nord, at the confluence of the Scheldt and Ronelle, 27 m. S. E. of Lille; pop. in 1872, 24,662. Its fortress, built by Vauban, is on an island in the Scheldt. It has a college, a school of chemistry, an academy for painting and sculpture, and a public library. The chief manufactures are linen, muslins, beet sugar, gold and silver tissues, toys, earthenware, and leather. The production of Valenciennes lace has much declined. The mines in the vicinity yield one fourth of the total French product of coal.—Valenciennes was a residence of the Merovingian kings, became one of the chief towns of Hainaut, and was unsuccessfully besieged by Louis XI. in 1477 and Turenne in 1656; but it was captured by Louis XIV. in 1677, and its possession was confirmed to France by the treaty of Nimeguen. It was taken by the allies in 1793 after a siege of six weeks, but recaptured in 1794. The Prussians occupied it from August, 1815, to November, 1818.

VALENCIENNES, Achille, a French naturalist, born in Paris, Aug. 9, 1794, died there, April 14, 1865. In 1830 he became professor of anatomy in the normal school. In 1844 he succeeded Geoffroy Saint-Hilaire in the academy of sciences. His works include *Histoire* *naturelle des poissons*, commenced with Cuvier (11 vols., Paris, 1829–'49), and *Histoire naturelle des mollusques, des annélides et des zoophytes* (1833).

VALENS, Flavius, a Roman emperor of the East, born about A. D. 328, killed at Adrianople, Aug. 9, 378. In March, 364, his brother Valentinian I. made him emperor of the East. In the following year Procopius was proclaimed emperor by the people of Constantinople, and met and defeated Valens at Chalcedon; but in 366, after two successful battles, Valens captured Procopius and slew him. After reducing the taxes one fourth, and being baptized, in 367 he began a war with the Goths who had assisted Procopius, and at first was successful, compelling Athanaric to sue for peace. Returning in triumph, he began a desultory war against the Persians, chiefly in defence of Armenia. In the mean time the Goths, retiring before the Huns, had been permitted to settle in Mœsia; but they soon became discontented, ravaged Thrace and Macedonia, and defeated the Romans in several battles. The last of these, at Adrianople, in which Valens perished, was one of the severest reverses the Romans ever experienced.

VALENTIN, Gabriel Gustav, a German physiologist, of Jewish parentage, born in Breslau, July 8, 1810. He took his degree in medicine at Breslau in 1832, and in 1836 became professor of physiology at Bern. His works include *Lehrbuch der Physiologie des Menschen* (2 vols., Brunswick, 1845; 2d ed., 1847–'50); *Grundriss der Physiologie des Menschen* (1846; 4th enlarged ed., 1855); and *Versuch einer physiologischen Pathologie des Blutes und der übrigen Körpersäfte* (Leipsic, 1866).

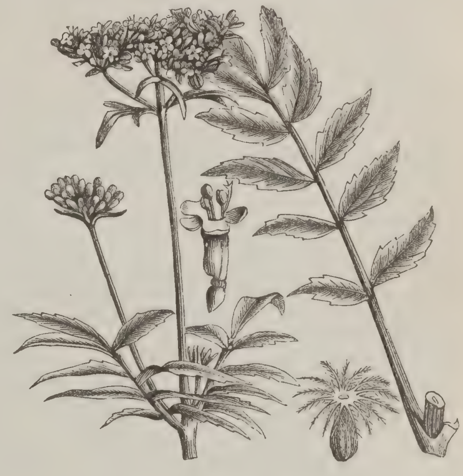
VALENTINE, Saint, according to some ecclesiastical writers a bishop, according to others a presbyter, who was beheaded at Rome in the reign of the emperor Claudius (270), and was early canonized. Wheatley says that St. Valentine "was a man of most admirable parts, and so famous for his love and charity, that the custom of choosing Valentines upon his festival (which is still practised) took its rise from thence." Others derived the custom from birds being supposed to select their mates on this day; others from a practice prevalent in ancient Rome at the festival of the Lupercalia, during the month of February, when, among other ceremonies, the names of young women were placed in a box, from which they were taken by young men, as chance directed. The pastors of the early church, finding it impossible to extirpate this pagan ceremony, changed its form. It was the custom on the eve of Feb. 14, St. Valentine's day, to have the names of a select number of one sex put into some vessel by an equal number of the other; and thereupon every one drew a name, which for the time being was called his or her Valentine. The custom of choosing Valentines existed very early. Presents of gloves, garters, and jewelry were common as valentines.

VALENTINIAN (VALENTINIANUS), the name of three Roman emperors. **I. Flavius,** born at Cibalæ, Pannonia, in A. D. 321, died at Bregetio, in the same province, Nov. 17, 375. He was the son of Count Gratian, and on the accession of Jovian in 363 he was made captain of the second company of the guards. On the death of Jovian at Dadastana in February, 364, the throne was offered by the army leaders to Valentinian, who was then at Ancyra. He assumed the purple on the plains of Nicæa, Feb. 26, and after reaching Constantinople made his brother Valens associate emperor with the control of the eastern provinces. Valentinian then went to Italy, and for some years was engaged in protecting the frontiers of the empire. He first fixed his headquarters at Lutetia (now Paris), and during 366 the Alemanni were defeated by his general Jovinus, the master of the horse. The following winter was spent at Durocortorum (Rheims), in building forts and taking other means of defence against the incursions of the Germans. In 367 the Alemanni surprised and plundered Moguntiacum (Mentz); but the emperor drove them back into their own country, defeating them at a place called Solicinum. In 370 the Saxons, who had made an incursion into Roman territory, were destroyed by an ambuscade. In 374 Valentinian prepared for a campaign against the Quadi, but died at Bregentio, near the modern town of Comorn, as he was on the point of setting out. He was one of the ablest of the Roman emperors, but his character was disfigured by passion and cruelty. He was succeeded by his son Gratian. **II. Flavius,** son of the preceding, born about 371, strangled May 15, 392. Immediately on the death of his father, he was raised by the army to the imperial dignity, being but four or five years old; and although his brother Gratian consented to this arrangement, and made a partition of the western empire, assigning to Valentinian Italy, Illyricum, and Africa, Gratian really exercised the supreme authority over all the territory until his murder in 383. Then Theodosius took charge of Valentinian, and upheld his rights in 387 and 388 against the usurper Maximus. In 392 he endeavored to rid himself of his general and chief adviser Arbogast by dismissal, and a few days later was found strangled in his apartment at Vienna in Gaul. **III. Placidius,** emperor of the West, born about 419, assassinated in 455. He was the son of Constantius and Galla Placidia, daughter of Theodosius I. On Oct. 23, 425, he received from his cousin Theodosius II. the purple and the title of Augustus. The first years of his reign, while his mother Placidia ruled for him, were marked by the disastrous rivalry between the last two great Roman generals, Aëtius and Boniface, and the consequent loss of Africa. In 437 Valentinian married at Constantinople Eudoxia, daughter of Theodosius. In the mean time the extreme provinces of the western empire were gradually attacked on all sides, and the Roman possessions were constantly diminishing. In 451 Aëtius defeated Attila near Châlons-sur-Marne; but in 452 the latter ravaged the north of Italy. Aëtius was in 454 killed by Valentinian's own hand, whose feeble mind had long been jealous of the commanding intellect and haughty character of his greatest general. Valentinian himself, the following year, while viewing a spectacle in the Campus Martius, was slain at the instigation of the patrician Petronius Maximus, whose wife the emperor had a short time before violated, and who usurped the throne. Valentinian was the last of the Theodosian line, and his vices were as conspicuous as his mental powers were contemptible.

VALENTINIANS. See GNOSTICS, vol. viii., p. 52.

VALENTINOIS, Duchess of. See DIANA OF POITIERS.

VALERIAN (Lat. *valere*, to be well), a genus of monopetalous plants, *valeriana*, which with a few others makes up the family *valerianaceæ*. On account of a similarity in the structure of the individual flowers, the family in a systematic arrangement stands near *compositæ*, though they are not, as in that order, collected into a head, but in a corymb or cyme. In valerian the inferior ovary has one fertile one-ovuled cell, and two empty or abortive ones; the adherent calyx has its limb developed as several plumose bristles, which are rolled inward in flower, but as the fruit matures expand as a pappus; the tube of the corolla is usually gibbous, or swollen at one side near the base, and the limb has five nearly regular lobes; stamens three. There are about 150 species, mostly perennial herbs, with thickened roots, which are strong-smelling when dry, entire or divided leaves, and white or rose-colored flowers; they are widely distributed, but most abundant in mountainous regions; three are natives of the northern states, but rather rare and local. The most important of these is the edible valerian (*V. edulis*), so called because its large spindle-shaped root, sometimes a foot long, is roasted and eaten by the western Indians; its leaves are fringed-ciliate, and its stem, 1 to 4 ft. high, bears an interrupted panicle of whitish flowers. *V. pauciflora* is found from Pennsylvania and Ohio southward, while the first named and *V. sylvestris*, our third native species, are northern and western. The best known of all the species is *V. officinalis*, the root of which is the medicinal valerian, and the plant is quite common in gardens, where it is cultivated for the fragrance of its flowers; the leaves have from 11 to 21 oblong, cut-toothed, somewhat downy leaflets; the stem, 2 to 3 ft. high, bears a broad, terminal corymb of small white flowers, often tinged with pink, with an odor like that of heliotrope, on which account it is often called garden heliotrope. A closely related species, with less divided leaves, *V. phu*, is also cultivated. The medicinal species is found all over Europe, from Spain to Iceland, and in northern Asia, and is cultivated in England and sparingly in this country for its roots; it has an erect rootstock, to which are attached numerous rootlets 3 to 4 in. long; the rootstock is usually cut to facilitate drying. When freshly dug the root has no characteristic odor, but when dry it has a peculiar terebinthine or camphorous odor, and a bitterish aromatic taste. The chemical composition of the root is somewhat complex; when fresh it gives from ½ to 2 per cent. of volatile oil; the dried root yields less oil, with valerianic acid, which results from the oxidation of the oil during the drying, and a resinous substance; the changes which take place in the root, and the different products, have not been well studied. Valerian has long been used in medicine, and it is supposed that the *phu* mentioned by Dioscorides and other ancient writers was this plant. In the 16th century it was used in England to flavor soups and pottages, and the roots, though the odor is now disagreeable to most persons, were placed among clothes as a perfume. Cats are exceedingly fond of the odor; a piece of the root seems to intoxicate them. Valerian belongs to that class of nervous stimulants known as antispasmodics, and in hysteria and other affections of women it is used in both domestic and regular practice; it is administered in the form of infusion, tincture, and fluid extract.—The valerian family includes *centranthus*, of which several species are cultivated as ornamental plants, and *fedia*, of which *F. olitoria* is cultivated, and is known as corn salad.


Valerian (Valeriana officinalis).

VALERIAN (PUBLIUS LICINIUS VALERIANUS), a Roman emperor, who reigned from A. D. 253 to 260. He was descended from a noble Roman family, rose to the highest honors of the state, and was fixed upon by the emperor Decius, who in 251 had determined to revive the censorship, as the fittest person for that post; but he was saved from discharging its unenviable duties by the death of the emperor. His successor Gallus sent Valerian to bring the legions of Gaul and Germany to aid in quelling the rebellion of Æmilianus; but before his arrival Gallus had been slain. Æmilianus shared the same fate, and Valerian was called to the throne. He immediately associated with himself in the empire his son Gallienus. His whole reign was spent in resisting the assaults of the Franks, Alemanni, and Goths, and in the East of the Persians. Leaving the defence of the West to his son and to his lieutenant, the emperor marched against the Persian monarch, but was taken prisoner with his army, and the victory of Sapor was followed by the capture of Antioch and the overrunning of Asia Minor. His son usurped the throne, gave himself up to debauchery, and allowed the empire to be overrun by the barbarians. (See GALLIENUS.) Valerian died in captivity. The accounts of his reign are contradictory, and the chronology is uncertain.

VALERIANIC ACID, or **Valeric Acid,** an acid which bears the same relation to amylic alcohol that acetic acid does to ethylic or common alcohol. It was first obtained by Chevreul in 1817 from the fat of a dolphin, *delphinum phocæna*, and was called delphinic or phocenic acid. In 1830 Grote obtained from the essential oil of valerian an acid which he called valerianic acid, and which was shown by Trommsdorff and Ettling to be identical with Chevreul's delphinic acid. It was afterward produced by oxidation of amylic alcohol by Dumas and Stas, who pointed out its relation to this body and showed its composition to be $C_5H_{10}O_2$. It is found in many vegetables, as valerian, angelica, and several other roots, in the fruit and bark of *viburnum opulus*, in the bark of the elder, and in many composite plants. It is also produced by the oxidation of fats and the putrefaction of albuminous substances. It is prepared from amylic alcohol by adding to it twice its weight of strong sulphuric acid, and passing this slowly into a solution of bichromate of potash, and, after heating for some time in a flask, distilling and saturating the distillate with sodium carbonate. Sodium valerianate is produced, which is treated with sulphuric acid and distilled. It is a colorless, mobile oil, having a sour, burning taste, and an odor resembling oil of valerian combined with rancid cheese. Its specific gravity at 61° is 0·937, according to Dumas and Stas; and its index of refraction, according to Delffs, is 1·3952. It affects the plane of polarization of light according as it has been prepared from active or inactive amylic alcohol. The active modification produces a rotation of +43° in a tube 50 centimetres long. It boils at 347° F., and remains liquid and transparent at 5°. It dissolves in 30 parts of water at 53·6°, and in all proportions with alcohol and ether. Its vapor passed through a red-hot tube is converted into carbonic anhydride, carbonic oxide, ethylene, tritylene, and tetrylene, with sometimes light carburetted hydrogen. It is monobasic, forming neutral salts having the general formula $C_5H_9MO_2$, and a few acid and basic salts.—The valerianates are unctuous to the touch, inodorous when dry, but with a pungent strong smell of valerianic acid when moist, which is heightened by warmth. Valerianate of ammonia is prepared by passing ammoniacal gas through valerianic acid. It crystallizes in white, pearly, four-sided, tabular crystals, having an offensive odor. It is often formed in the putrefaction of organic bodies, and is a frequent constituent of rancid cheese. It was introduced as a therapeutic agent by M. Déclat of Paris for the treatment of neuralgia; it may be given in doses of one or two grains of the salt dissolved in water. Valerianate of bismuth has been used successfully in neuralgia and painful affections of the stomach, in doses of from one to two grains. Valerianate of iron is often used in hysterical affections complicated with chlorosis, in doses of one grain, repeated several times a day. Valerianate of quinia is prepared by dissolving the alkaloid in valerianic acid and evaporating the solution below 120° F. It is a colorless salt, crystallizing in rhombohedral plates having a bitter taste and a powerful, repulsive odor, soluble in 110 parts of cold and 40 parts of boiling water. By continuing the boiling, the salt is decomposed with evolution of valerianic acid. It is given in cases of debility and nervous affections, in doses of one or two grains several times a day. Valerianate of atropia, the active principle of *atropa belladonna*, has been employed with benefit in epilepsy and other nervous diseases, in very minute doses. Valerianate of zinc is prepared by the action of valerianate of soda on sulphate of zinc. It possesses decided antispasmodic properties, and has been used with advantage by Dr. Namias of Venice, Italy, in nervous affections attended with palpitation of the heart, and by Dr. François Devay of Lyons, France, in epilepsy and in nervous affections accompanying chlorosis. The valerianic ethers, or valerianates of the alcohol radicals, are prepared by distilling valerianate of sodium with sulphuric acid and the corresponding alcohols. Amylic valerianate dissolved in six or eight parts of alcohol forms a flavoring liquid known as apple essence.

VALERIUS CORVUS, Marcus, a Roman general, born about 371 B. C., died about 271. In 349, being tribune under L. Camillus in his campaign against the Gauls, he accepted the challenge of a gigantic barbarian to single combat, and killed his antagonist, as the story goes, with the assistance of a raven, which perched upon Valerius's helmet, and as often as he advanced upon his foe flew at the Gaul's face. A general battle ensued, in which the Romans were completely victorious. From this circumstance Valerius is said to have derived his surname of Corvus. He was made consul in 348 and five times subsequently. In 343 he gained two brilliant victories over the Samnites at Mount Gaurus and at Suessula. In 342 he was appointed dictator in consequence of a mutiny in the army, which he quelled by his personal popularity. He was dictator again in 301, when he defeated the Marsi and Etruscans. The last 28 years of his life were passed in retirement. He held curule dignities 21 times, and repeatedly enjoyed the honors of a triumph.

VALERIUS FLACCUS, Caius, a Latin poet, born in Padua, flourished in the time of Vespasian, and died about A. D. 88. Nothing is known of his life, and his only work now extant is the unfinished heroic poem called the *Argonautica*, in which he narrates the adventures of Jason and his companions. His poem was discovered in 1416 in the monastery of St. Gall, and was first published in 1472. The best edition is Theil's (Halle, 1863). It has been translated into English verse by Nicholas Whyte (1565), and the first book by Thomas Noble (1809).

VALERIUS MAXIMUS, a Roman author, who flourished during the reign of Tiberius. Nothing is known of his life except that he accompanied Sextus Pompius, the friend of Ovid, into Asia. His name is appended to a collection of historical anecdotes under the title of *Factorum et Dictorum Memorabilium Libri IX.* The compilation embraces a large variety of subjects, and as a historical authority is of some value. His diction is very ornate, but often incorrect and obscure. He was one of the favorite authors of his time, and the frequent copying of his works has undoubtedly been very injurious to the text. His books were also a favorite study in the middle ages, and were frequently imitated (as by Saxo Grammaticus), abridged, and translated. Epitomes of his works by Julius Paris and Januarius Nepotianus are extant. The best edition with critical apparatus is Halm's (Leipsic, 1865). It was translated into English by W. Speed (London, 1678).

VALERIUS PUBLICOLA. See PUBLICOLA.

VALETTA, or **La Valetta,** a seaport town, capital of the island of Malta, on the N. E. coast, in lat. 35° 54′ N., lon. 14° 31′ E.; pop. about 60,000. It occupies an elevated peninsula between two harbors, the one on the east, called the Great harbor, extending about 2 m. inland. Five forts command the approach by sea, and five lines of fortifications, mounting 1,000 guns, and hornwork, extend across the isthmus. The ground upon which it stands is very uneven, and the streets are connected by flights of steps. The cathedral was built in 1580, and is exceedingly interesting for its numerous monuments in marble and bronze, paintings, and curious relics. The keys of Jerusalem, Acre, and Rhodes are deposited in it. There are 19 other churches. The palace of the grand master of the knights of Malta is now the governor's residence; it contains a corridor hung with the portraits of the knights, an armory with many kinds of ancient armor, and a library and museum adjoining. The university was founded in 1838, and has faculties of divinity, law, medicine, and arts. There are naval, military, and civil hospitals. The other buildings most worthy of notice are the exchange, theatre, several *auberges* or separate palaces of the knights, and the house of industry. A great aqueduct supplied Valetta with water from Città Vecchia, 8 m. distant. The botanic garden is in the suburb of Floriana. The burial grounds have been formed out of the bastions of the fortifications. The opera house, erected at great cost a few years before, was destroyed by fire

Valetta.

in May, 1873. (For the commerce and history of the city, see MALTA, and VALETTE.)

VALETTE, Jean Parisot de La, a grand master of the knights of Malta, born in 1494, died in Malta, Aug. 21, 1568. He belonged to an eminent family of Toulouse, passed through every grade of his order to lieutenant general, and was in 1557 unanimously chosen grand master as successor of Claude de la Langle. The assistance which he rendered in the wars against the Turks, and the rapid growth of the order under his administration, induced Solyman the Magnificent to fit out an expedition for the reduction of Malta; and on May 18, 1565, 180 Turkish vessels of war, with 30,000 troops on board, cast anchor in the gulf of Mugiarro. La Valette had constructed new fortifications at the N. E. extremity of the peninsula now occupied by the city of Valetta, but his garrison consisted of only 700 knights and 8,500 soldiers, including the inhabitants who had been armed for the occasion; yet with these he withstood one of the most terrific sieges on record until Sept. 8, when, on the arrival of the viceroy of Naples with 8,000 men for his assistance, the Turks took to their ships. They disembarked again, but were defeated with great slaughter and fled in disorder. Their loss during the siege is said to have been 30,000 (they had several times been reënforced); while the knights, on the departure of the Turkish fleet, had barely 600 left of all their combatants. La Valette rebuilt the fortifications, and founded the town of Valetta, to which he removed the residence of the knights from Città Vecchia.

VALHALLA. See MYTHOLOGY, vol. xii., p. 120.

VALLA, Lorenzo, an Italian scholar, born in Rome about 1410, died there or in Naples about 1460. He was ordained a priest in 1431, taught rhetoric in Pavia and other cities, and in 1435 went to Naples, where he gained the friendship of Alfonso I., and accompanied him in his wars and voyages. In 1443 he returned to Rome, where he incurred the hostility of the cardinals and Pope Eugenius IV. by attacking the authenticity of the instrument known as the "donation of Constantine," upon which the popes in great part based their claims to temporal sovereignty. Valla fled to Naples and opened a school, but became involved in theological controversies, and only escaped the inquisition through the protection of the king. He was subsequently received in Rome by Pope Nicholas V., to whom he presented a portion of the Homeric poems translated for the first time into Latin, and his translation of Thucydides, for which he received 500 crowns and the offices of apostolical secretary and canon of St. John Lateran. His works, including *Elegantiæ Linguæ Latinæ*, in six books, were collected in 3 vols. fol. (Basel, 1543).—See Vahlen's *Lorenzo Valla* (Vienna, 1864).

VALLADOLID. **I.** A N. W. province of Spain, in Old Castile (by some included in the kingdom of Leon), bordering on Leon, Palencia, Burgos, Segovia, Ávila, Salamanca, and Zamora; area, 3,043 sq. m.; pop. in 1870, 242,384. The surface, though elevated, is generally level, and the soil is sandy. The principal rivers are the Douro and its affluents the Duraton, Eresma, and Pisuerga. The province produces grain, red and white wines, flax, hemp, madder, and timber. There are excellent pastures, and numerous horses, cattle, sheep, and mules are raised. Paper, earthenware, and various fabrics of hemp and flax are manufactured. **II.** A city, capital of the province, in an extensive plain on the left bank of the Pisuerga, at the terminus of the canal of Castile, 100 m. N. W. of Madrid; pop. about 50,000. It is irregularly built, but contains some fine streets and squares. The cathedral, begun by Philip II., has never been completed; it has a Doric façade, with an arch over the principal entrance 50 ft. by 24. There are many other churches, convents, and nunneries, of which the churches of Santa Maria la Antigua, San Martin, and San Benito are fine specimens of architecture. The university, for students of law and of medicine, was founded by Alfonso XI. in 1346. There are several colleges, a museum containing the statues, pictures, and other works of art which were removed from the suppressed convents, a royal palace, a theatre, a lyceum, and a public library. Silks, lace, paper, woollens, and earthenware are manufactured, and there is a large trade in corn. —Valladolid was called Belad-Walid by the Moors, from whom it was taken by Ordoño II. of Leon in 920. It was the capital of Castile and of Spain from the beginning of the 15th century till 1560, when Philip II. removed the court to Madrid. Columbus died in Valladolid.

VALLADOLID, a city of Mexico. See MORELIA.

VALLADOLID, a town of Mexico, capital of a department of the same name in the state of Yucatan, 90 m. E. S. E. of Mérida; pop. about 15,000. The streets are well laid out and clean, and the houses are generally one story high with flat roofs. There are several churches, a town house, and an aqueduct. The climate is healthful, and the town is much resorted to by invalids. Cotton is manufactured.

VALLADOLID, a town of Honduras. See COMAYAGUA.

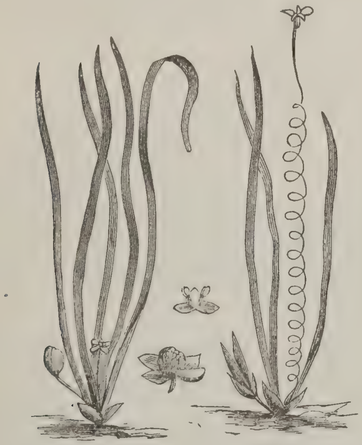
VALLAURI, Tommaso, an Italian philologist, born at Chiusa di Cuneo, Jan. 23, 1805. He early became professor of rhetoric in the university of Turin, and afterward of Greek and Latin eloquence; and he ranks as one of the best Latinists of Italy. His works include *Historia Critica Literarum* (1849; 7th ed., 1868); *Trinumus* (1855); *Menæchmi* (1859); *Novelle* (4th ed., 1868); editions of Ausonius Popma's *De Differentiis Verborum* (1852), and of the *Aulularia* (1853) and *Miles Gloriosus* (1854) of Plautus; Latin-Italian dictionaries; and books on history and literature.

VALLE, Pietro della, an Italian traveller, surnamed Il Pellegrino, born in Rome, April 2, 1586, died there, April 20, 1652. In June, 1614, he embarked from Venice in the habit of a pilgrim. He went first to Constantinople, remained a year, then visited Egypt and the Holy Land, and at Bagdad married a Nestorian woman. He next journeyed over Mesopotamia, and finally went to Ispahan and engaged in the war between Persia and Turkey. His wife having died, he embalmed her body and took it home with him, travelling through India, and reaching Rome in 1626. To Pope Urban VIII., who made him honorary chamberlain, he presented a short account of Georgia, in order to induce him to send missionaries to that country. Not long afterward he married a Georgian, whom he had brought with him from the East. His travels, written in the form of letters, were published at Rome in 1650–'53 in 4 vols. (English translation, fol., London, 1665). Several other works were composed by him, many of which were never published. His narratives, in spite of their prolixity, are very accurate.

VALLEY, a central county of Nebraska, intersected by Loup fork and its N. branch; area, 576 sq. m.; pop. in 1875, 287. The surface is rolling, and consists chiefly of productive prairies.

VALLIÈRE, Mlle. de La. See LA VALLIÈRE.

VALLISNERIA, a genus of endogenous aquatic plants, named in honor of Antonio Vallisnieri. It belongs to a small family, the *hydrocharidaceæ*, all water or marsh plants, and consists of but two species, one exclusively Australian, and the other, *V. spiralis*, found in the fresh waters of most countries, especially the warmer ones, and in nearly all parts of the United States, where it is known as tape grass and eel grass, though quite distinct from the eel grass of salt waters (*zostera*). The stem or rootstock lies prostrate in the mud; from this proceed the tape-like leaves, 1 to 2 ft. long, 2 to 5 lines wide, and minutely serrulate on the edges; these are dark green and entirely submerged. The flowers are diœcious; those of the staminate plant are several in a small cluster, surrounded by a three-valved spathe and borne upon a very short scape which rises at the base of the leaves. The fertile flowers are solitary, with a long ovary, at the apex of which are three small petals and three large two-lobed stigmas; each flower is borne upon a slender spirally coiled scape, which is from 2 to 4 ft. long, according to the depth of the water. At flowering time these female or pistillate flowers rise by means of their long flexible stems to the surface of the water, where they are quite beyond the reach of the staminate or male flowers, which are confined at the bottom upon a stem only about an inch long. The male flowers, as they mature, spontaneously break away from their short stems and rise to the surface, where they expand and float about, shedding their pollen upon the stigmas of the female flowers; after fertilization takes place, the long stem to the pistillate flower shortens its coils and carries the impregnated ovary to the bottom again, where it ripens into a many-seeded berry from half an inch to two inches long. The leaves of *Vallisneria* afford a most interesting object for the microscope; the tissues being very thin and transparent, they allow the contents of the cells to be distinctly seen, and these are found to be in constant motion, the contents of each cell moving independently of those of the others. The plant is very abundant in some waters; there are localities upon the Hudson where at certain seasons it is difficult to force a boat through it. It is also abundant on the waters of Chesapeake bay, where it is called by the singular misnomer of wild celery; the rootstocks and their buds are the favorite food of the canvas-back duck, a fact recognized in its specific name, *fuligula Vallisneria.*



Vallisneria spiralis—Staminate and Pistillate.

VALLISNIERI, Antonio, an Italian naturalist, born at Tresilico, Modena, May 3,1661, died in Padua, Jan. 18, 1730. He studied medicine at Bologna, and about 1688 began practice in Reggio. In 1700 he became professor at Padua, where he excited opposition by his attempted reforms in medicine. He was indefatigable in his efforts to advance the knowledge of natural history, and in his researches on generation, and opposed the doctrine of spontaneous generation. His complete works were published at Venice in 1733 (3 vols. fol.).

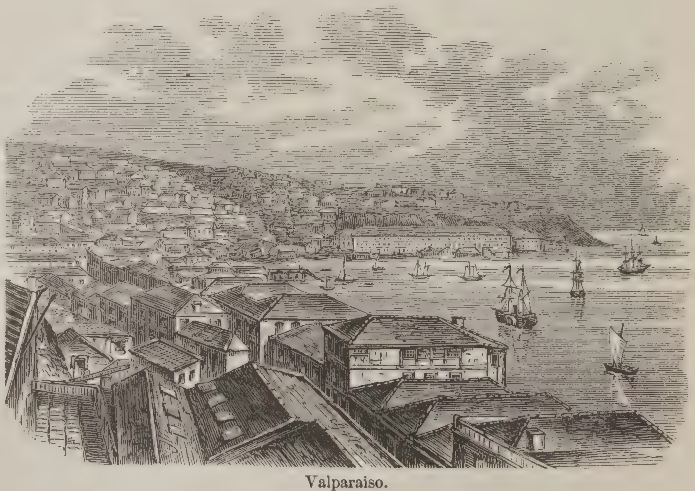
VALLOMBROSA (shady valley), an abbey in a valley of the Apennines about 15 m. E. of Florence. It was founded by St. Giovanni Gualberto about 1038, under the rule of St. Benedict, and the institution was approved by Pope Alexander II. in 1070. The original purpose of the founder was to establish separate hermitages, but the cenobitic or community life soon prevailed, and the Vallombrosians are now recognized as a branch of the reformed Benedictines. In 1500 they exchanged their gray habit for a brown one, and in 1662, on their union with the Silvestrines, adopted a black dress. The present buildings were erected in 1637. The abbey was wealthy. It was suppressed in 1863; the monastery and church are now occupied by the royal school of forestry, opened in 1869.

VALMORE, Marceline Félicité Josèphe Desbordes, a French authoress, born in Douai about 1787, died in Paris, July 7, 1859. She was the daughter of M. Desbordes, a poor artist, and spent a part of her early life with her mother in Guadeloupe. On her return to France she appeared on the stage as a singer, and in 1817 she married the tragedian Valmore. Her works include *Recueil de poésies* (3 vols., 1829); *Les veillées des Antilles* (2 vols., 1830); *L'atelier d'un peintre* (2 vols., 1833); and *Le salon de Lady Betty* (2 vols., 1836).—See Sainte-Beuve, *Madame Desbordes-Valmore, sa vie et sa correspondance* (Paris, 1870; English translation by Harriet W. Preston, Boston, 1872).

VALOIS, House of, a younger branch of the Capetian dynasty, so called from the territory of Valois in Île de France, which occupied the throne of France 261 years, from the accession of Philip VI. in 1328 to the death of Henry III. in 1589 and the accession of Henry IV., the first of the Bourbons. (See PHILIP VI., and FRANCE.)

VALONIA. See OAK, vol. xii., p. 558.

VALPARAISO. I. A W. central and the smallest province of Chili, bounded N. by Aconcagua, E. and S. by Santiago, and W. by the Pacific; area, including the islands of Juan Fernandez, which belong to it, 1,670 sq. m.; pop. in 1875, 176,682. The surface is mountainous, and the soil, where not irrigated, is poor, excepting in some of the valleys, which are very fertile and produce excellent crops of the cereals, grasses, and fruits. Wine and brandy are made in considerable quantities. Mines of copper and silver are worked, but agriculture is the principal industry. It is divided into the departments of Valparaiso, Quillota, Limache, and Casablanca, named after their chief towns. The department of Valparaiso is divided into 24 subdelegations, of which the city comprises 20, the rural suburbs three, and the islands of Juan Fernandez one. **II.** A city, capital of the province, on a bay of the same name, in lat. 33° 1′ 56″ S., lon. 71° 41′ 45″ W., 70 m. N. W. of Santiago; pop. about 110,000. Back of the city is a high chain of hills, which nearly surround the bay, opening only toward the north. The older part of the city, called the port, extends along the shore at the base of the hills. It contains the principal public and commercial buildings. Beyond it is San Juan de Dios, which extends to the plaza de la Victoria, and beyond that is the Almendral, the most thickly populated quarter, where most of the retail business is done. Still further on is El Baron, on a hill of the same name, and next is La Cabritería, on the road leading to Quillota. The other principal quarters, named from the hills on which they are situated, are Cordillera, Santo Domingo, San Francisco, Carretas, Artillería, Toro, Arrayan, Alegre, and Concepcion. The last two contain the residences of most of the foreign merchants. The streets are generally narrow and irregular, excepting in the newer parts, where they are broad and laid out at right angles to each other. There are six plazas. Among the principal buildings are the government palace, the custom house and government warehouses, the post office, built in 1869, the exchange, the city hall, and two theatres, one of which, the Victoria, will seat 2,000 persons, and is remarkable for its interior decorations. Besides three parish churches, there are several others, of which the Franciscan, a Gothic edifice, is the finest; several chapels and oratorios, and three Protestant churches. Among the charitable institutions is the English, French, and United States hospital, attended by resident physicians. The city is lighted with gas, and has lines of horse cars and steam fire engines. Of the inhabitants of Valparaiso about 75,000 are natives, 15,000 Germans, 6,500 British, 3,750 French, 1,500 Italians, 250 Americans, and the remainder mostly natives of other South American states.—The bay is well sheltered excepting on the north, is capacious, and has plenty of water. It is defended by a chain of 15 forts, mostly built since 1866, mounting in the aggregate 142 guns. Its position gives it great com-


Valparaiso.

mercial advantages, and it is the chief port in the South Pacific. It is the headquarters of foreign men-of-war in the Pacific, and is connected with Panama and intermediate ports by an English and a Chilian line of steamers, and with Hamburg by a German line. It is connected with Santiago by railway. During the year ending Sept. 30, 1874, the port was entered by 1,585 vessels, of 973,090 aggregate tonnage. Of these 611 were British, 276 Chilian, 161 Nicaraguan, 103 German, 101 French, 99 Guatemalan, 87 American, 67 oriental, and 46 Italian. The total value of exports to the United States during that year was $1,041,697; of imports from the United States, $1,999,476.—Valparaiso was founded in 1544; taken by Drake in 1578, and again in 1596 by Hawkins's expedition; and sacked in 1600 by the Dutch corsair Oliver van Noort. It was nearly destroyed by earthquakes in 1730 and 1822. On March 31, 1866, it was bombarded by a Spanish squadron under Admiral Nuñez, and a large part of it ruined. (See CHILI.)

VALTELLINA (from the It. *Val Tellina;* Ger. *Veltellin* or *Veltlin*), a valley of Lombardy, in the province of Sondrio, separated by the Rhætian Alps from the Engadine, bounded N. by the Swiss canton of Grisons, N. E. by Tyrol, from which it is separated by the Ortler and the Stilfser Joch, S. by the provinces of Brescia, Bergamo, and Como, and W. by the lake of Como and the valley of Chiavenna. The valley of Valtellina proper is 45 m. long, and with its continuation, the valley of Bormio, 55 m. Together with the valley of Chiavenna it constitutes the province of Sondrio; and the three valleys are sometimes collectively called Valtellina. It is remarkable for fertility, the chief products being wine, grain, fruit, and cheese. The three valleys belonged in the latter part of the middle ages to the dukes of Milan. They became part of Grisons in 1512, and through the influence of France remained in possession of the Swiss despite the efforts of Austria during the thirty years' war to secure the territory. In 1797 Valtellina became part of the Cisalpine republic, and in 1804 of the French department of Adda. In 1814 it came under Austrian rule as part of Sondrio, and in 1859 under Italian rule. Besides Sondrio, the capital of the province, the most noted localities are Teglio, formerly the capital of Valtellina; Grossotto, where a fearful massacre of Protestants took place on July 19, 1620, known as the Valtellina massacre; and Morbegno, where the inquisition took up its headquarters after this episode, and which derived its name from the prevailing malaria.

VÁMBÉRY, Arminius, a Hungarian traveller, of Jewish parentage, born at Szerdahély, county of Presburg, in 1832. He was intended for a tailor, but studied at Presburg, Vienna, and Pesth, supporting himself in the intervals as a private teacher. He finally went in this capacity to Constantinople, where he familiarized himself with eastern languages. To acquire a knowledge of those of central Asia, he went in 1862 to Persia with the aid of the Pesth academy. In the disguise of a dervish he joined in 1863 Yarkand pilgrims returning from Mecca, and in that and the following year he explored parts of Turkistan, visiting the cities of Khiva, Bokhara, and Samarcand. On his return to Pesth he became oriental professor at the university, which post he still holds (1876). His works include a Turkish-German pocket dictionary (1858); "Travels in Central Asia" (1865); *Cagataische Sprachstudien* (1867), one of the first works written on the Turkish of the East, but the accuracy of which is contested; "Wanderings and Adventures in Persia" (1867), to which he added in 1868 "Sketches of Central Asia;" *Uigurische Sprachmonumente und das Kudatku-Bilik* (1870); *Magyar-török szóhasonlatok*, a comparison of Hungarian and Turkish words (1870); "History of Bokhara or Transoxiana, from the Earliest Period down to the Present" (1873); "Central Asia and the Anglo-Russian Frontier Question" (1874); and "The Islam in the Nineteenth Century" (1875). His principal works were translated by himself into English, and published simultaneously in English and German, and have been translated into other languages. Vámbéry is friendly to England, where his writings are very popular; but Russian and other authorities tax him with inaccuracies of statement, some of them going so far as to allege that he had never visited Samarcand and other places of which he gives elaborate descriptions. He has in press (1876) a work on the history, traditions, languages, and literatures of the various Turkish tribes in Asia and Europe.

VAMPIRE, in zoölogy. See BAT.

VAMPIRE, a fabulous creature of popular belief, especially in Greece, Hungary, Moravia, Silesia, Poland, and Russia. The ghouls of the Persians and Arabians, subjects of a like credulity, seem closely related to the fabled vampire, and may have suggested it. Vampires were described as persons who for a considerable time after death leave their tombs to disturb the living, usually their young relatives, sucking their blood, appearing to them, making strange noises, and often causing death. The fatal epidemics prevalent in the 17th and 18th centuries, and the sudden deaths or languor and exhaustion which marked their severity, fostered this superstition. Many bodies disinterred, being found undecayed and with liquid blood and fresh complexion, were for these reasons deemed undoubted vampires; and to prevent their fatal activities sharpened stakes were driven through them and their hearts and heads were severed and burned.

VAN. I. A town of Turkish Armenia, in the vilayet and 145 m. S. E. of the city of Erzerum, near the E. shore of Lake Van; pop. about 35,000. It is in a beautiful region of fruit trees and gardens. The streets are in a miserable condition, and there are no notable buildings excepting the palace of the local authorities, the mosques, and Armenian churches. A third chapel and a school were opened in 1874 by the American missionaries. Coarse cotton cloth is made and exported, and there are salt refineries. A rocky hill with a ruined citadel extends over one mile; inside the citadel are vast caves with cuneiform inscriptions and other relics referred to the days of Semiramis, who, according to tradition, laid out the city on a magnificent scale and resided there in summer; hence the Armenian name of Shamiramagerd, city of Semiramis. It took its present name from the Armenian king Van (371–351 B. C.), who embellished and extended the place. Under the real or nominal rule of the Macedonian and Syrian Greeks it became known as Iban. It was afterward the seat of the Armenian dynasty of the Arsacidæ, which, with intervals of Roman domination, reigned till A. D. 428, when the country was subjugated by the Persians. At the close of the 10th century Van flourished once more as the capital of the third Armenian kingdom of Vashburagan. The invasion of the Seljuk Turks in the 11th century ushered in a long series of calamities, and the extinction of the Armenian kingdom. The sanjak of Van comprises a large population of Armenians, Kurds, and Turkomans. **II.** A celebrated salt lake, the largest in Armenia, about 1,400 sq. m. in extent, and 5,400 ft. (according to Rawlinson) above the sea level. It is a triangular basin extending N. E. to S. W. over 80 m. between Arnis and Tadvan; greatest width, between Akhlat and Van, about 50 m. It is surrounded by high mountains, reaching in parts the level of perpetual snow, alternating with beautiful plains. The waters are of the deepest blue; the luxuriant vegetation along its banks is unsurpassed in that part of Asia. It has no outlet, but is less impregnated with salt than Lake Urumiah, receives several streams, and contains islets. Among the interesting towns on the lake shore is Akhlat, once the residence of Armenian kings, with a vast population.

VANADIUM, a metal, first recognized as distinct in 1801 by Del Rio, who found it in the brown lead ore (now known as vanadinite) of Zimapan in Mexico, and called it erythronium. But it was generally considered by chemists to be chromium, an opinion afterward adopted by Del Rio himself. In 1830 Sefström found the iron made from the magnetic ore of Taberg in Sweden, as well as the cinder produced in its conversion, to contain a peculiar metal, which he called vanadium, from Vanadis, one of the names of the Scandinavian goddess Freyja; and the Zimapan lead ore was afterward found by Wöhler to contain the same metal. It has also been discovered in the iron slag of Staffordshire, and recently by Roscoe in larger quantity in the copper-bearing beds at Alderley Edge and Mottram St. Andrews, Cheshire, by Dr. Bolton in pitchblende, by Dr. Hayes in many rocks, and by Böttger in pea iron ores. The metal is obtained by prolonged ignition of the dichloride in a stream of pure dry hydrogen gas. It is a grayish white powder, which has the appearance under the microscope of a silver-white crystalline mass. It does not tarnish in the air, burns with brilliant scintillations when thrown into a flame, burns vividly when quickly heated in oxygen, forming a pentoxide, and takes fire in a current of chlorine gas, forming a tetrachloride. It is insoluble in hydrochloric acid. It has until recently been regarded as a hexad metal, analogous to tungsten; but Roscoe has shown, by a comparison based upon the composition of the oxides and oxychlorides, and upon the isomorphism of the vanadates with phosphates, that it is a pentad, belonging to the arsenic and phosphorus group. Vanadium forms five oxides: V_2O, V_2O_2, V_2O_3, V_2O_4, and V_2O_5; compounds analogous to the oxides of nitrogen, V_2O_5 being called vanadic anhydride, and sometimes pentoxide of vanadium. The monoxide, V_2O, is a brown substance formed by prolonged exposure of the metal to the air at ordinary temperatures, or more quickly at a dull red heat. The dioxide, V_2O_2, is produced by continued heating of the monoxide. The trioxide, V_2O_3, is formed by igniting the pentoxide, V_2O_5, in hydrogen gas, or in a crucible lined with charcoal. When exposed to warm air it absorbs oxygen, glows with a dull red light, and passes again into pentoxide. Vanadious oxide or anhydride, or vanadium tetroxide, V_2O_4, is formed by further oxidation of the dioxide or trioxide, or by partial reduction of the pentoxide. It forms with acids vanadious salts, which have a bright blue color. Vanadium pentoxide, or vanadic anhydride, may be prepared from the native lead vanadate. The mineral is dissolved in nitric acid, and the lead and arsenic precipitated by sulphuretted hydrogen, which also reduces the vanadium pentoxide to tetroxide. The blue filtered solution is then evaporated to dryness, which reconverts the tetroxide to pentoxide. It is then digested in aqua ammonia, which dissolves the pentoxide. A lump of sal ammoniac (chloride of ammonium) is put into the solution, and as the salt dissolves ammonium vanadate is precipitated, being only very slightly soluble in a saturated solution of the chloride of ammonium. A temperature below redness expels the ammonium. It is a reddish yellow powder, which dissolves in 1,000 parts of water, forming a light yellow solution. With stronger acids it forms vanadic salts, but it unites with bases more readily than with acids, forming salts called vanadates of various constitution, as orthovanadates, having the general formula $(3MO),V_2O_5$; pyrovanadates, $(3MO),V_2O_5$; metavanadates, MO,V_2O_5, analogous to metaphosphates; divanadates, $MO,2V_2O_5$; and trivanadates, $MO,3V_2O_5$. In the United States the principal localities of vanadium minerals are at the Wheatley mine, Phœnixville, Pa., where several vanadates of lead occur, and at the Cliff mine, Lake Superior, where a chocolate-colored mineral is found containing vanadic acid. Vanadic acid is used in the manufacture of a permanent black ink.

VANAYL DE YONGH. See SAINT-ELME.

VANBRUGH, Sir **John,** an English dramatist, born probably in London in 1666, died there, March 26, 1726. He was of Flemish extraction, and received a liberal education, which was completed in France. He entered the army as an ensign, attained the rank of captain, and afterward became an architect. In 1695 he was appointed secretary to the commission for endowing Greenwich hospital, and two years later produced at Drury Lane theatre his first play, "The Relapse," which was very successful. "The Provoked Wife" (1697) had if possible a greater run; and in the next year the author, alarmed at the charges of indecency and profanity brought against him in Jeremy Collier's "Short View of the Immorality and Profaneness of the English Stage," presented the public with a moral lecture, in the form of a comedy entitled "Æsop." An adaptation of Fletcher's "Pilgrim," produced in 1700, was well received. In 1702 he made his first architectural design of celebrity, that of Castle Howard in Yorkshire, the seat of the earl of Carlisle. His next enterprise was the construction of a large theatre in the Haymarket, which he undertook to manage in conjunction with Congreve. The building was found to be incurably defective in acoustic properties, and Vanbrugh, after producing with indifferent success "Confederacy" (1705), and adaptations of three of Molière's comedies, retired from the enterprise, and devoted himself to the structure of Blenheim, voted by parliament to the duke of Marlborough. Before the completion of the work he became involved in a quarrel with the duchess, who after the duke's decease dismissed the architect and refused to pay him £2,000 which he had advanced to the workmen. By the aid of Sir Robert Walpole he finally got the money. Vanbrugh erected other buildings of less note, was knighted and made comptroller of the royal works in 1714, and in 1716 surveyor of the works at Greenwich hospital. He left an unfinished comedy, "The Journey to London," which was completed by Colley Cibber. His plays are smoothly written, and present amusing pictures of contemporary manners, but their grossness has gradually banished them from the stage. The best recent edition is that of Moxon (8vo, London, 1849, containing also the works of Congreve, Wycherly, and Farquhar), with a biographical notice by Leigh Hunt.

VAN BUREN, the name of four counties in the United States. **I.** A central county of Arkansas, intersected by Little Red river; area, 1,260 sq. m.; pop. in 1870, 5,107, of whom 119 were colored. The surface is undulating and the soil fertile. There is a great abundance of choice timber. The chief productions in 1870 were 165,710 bushels of Indian corn, 11,116 of oats, 6,199 of Irish and 6,104 of sweet potatoes, 52,985 lbs. of butter, and 7,264 of tobacco. There were 1,029 horses, 1,416 milch cows, 3,430 other cattle, 2,574 sheep, and 11,559 swine. Capital, Clinton. **II.** A central county of Tennessee, drained by the Caney fork of Cumberland river; area, 350 sq. m.; pop. in 1870, 2,725, of whom 239 were colored. The surface is generally mountainous and the soil tolerably fertile. Bituminous coal is abundant. The chief productions in 1870 were 14,002 bushels of wheat, 104,033 of Indian corn, 4,456 of oats, 5,095 of Irish and 4,216 of sweet potatoes, 32,788 lbs. of butter, 6,006 of wool, and 9,858 of tobacco. There were 718 horses, 766 milch cows, 1,467 other cattle, 3,247 sheep, and 8,584 swine. Capital, Spencer. **III.** A S. W. county of Michigan, bordering on Lake Michigan, and drained by several streams; area, 633 sq. m.; pop. in 1874, 29,156. The surface is generally level and the soil fertile. A large portion of the county is covered with forests of valuable timber. It is intersected by the Michigan Central railroad and South Haven division, and by the Chicago and Michigan Lake Shore line. The chief productions in 1870 were 387,658 bushels of wheat, 572,578 of Indian corn, 159,835 of oats, 304,465 of potatoes, 646,998 lbs. of butter, 24,111 of cheese, 121,106 of wool, and 26,615 tons of hay. There were 6,271 horses, 5,702 milch cows, 6,857 other cattle, 32,955 sheep, and 13,294 swine; 2 manufactories of carriages and wagons, 10 of pig iron, 6 of iron castings, 8 tanneries, 5 currying establishments, 8 flour mills, 53 saw mills, and 2 wood turning and carving establishments. Capital, Pawpaw. **IV.** A S. E. county of Iowa, bordering on Missouri and intersected by Des Moines and Fox rivers; area, 468 sq. m.; pop. in 1870, 17,672. The surface is level, consisting of prairie and timber land, and the soil is highly fertile. Bituminous coal abounds. It is intersected by the Des Moines Valley railroad. The Des Moines river is navigable for steamboats a portion of the year. The chief productions in 1870 were 231,827 bushels of wheat, 41,205 of rye, 906,874 of Indian corn, 255,820 of oats, 73,322 of potatoes, 443,586 lbs. of butter, 129,303 of wool, and 22,948 tons of hay. There were 7,137 horses, 5,850 milch cows, 8,996 other cattle, 38,112 sheep, and 25,866 swine; 1 manufactory of agricultural implements, 11 of carriages and wagons, 1 of paper, 3 of stone and earthenware, 4 woollen mills, and 6 flour mills. Capital, Keosauqua.

VAN BUREN. I. Martin, the eighth president of the United States, born at Kinderhook, N. Y., Dec. 5, 1782, died there, July 24, 1862. He began the study of law at the age of 14, and passed the last year of his studies in the office of W. P. Van Ness in New York. At 18 he was a delegate in a nominating convention of the republican (afterward called the democratic) party. In 1808 he was appointed surrogate of Columbia co. In 1812 he was elected to the senate of the state, and in that body voted for electors pledged to support De Witt Clinton for president of the United States. From 1815 to 1819 he was attorney general of the state, and in 1816 was again a member of the senate, the two offices being held together. In 1818 Mr. Van Buren set on foot a new organization of the democratic party in the state, and became the ruling spirit of a coterie of able politicians, known as the Albany regency, among whom B. F. Butler, W. L. Marcy, and Edwin Croswell were afterward prominent, who held the political control of the state uninterruptedly for more than 20 years. In 1821 Van Buren was chosen to the United States senate, and was elected a member of the convention to revise the state constitution. In the latter body he advocated an extension of the elective franchise, but opposed universal suffrage, as also the plan of appointing justices of the peace by popular election. He voted against depriving colored citizens of the franchise, but supported the proposal to require of them a freehold qualification of $250. In 1827 he was reëlected United States senator, but resigned that office on being chosen governor of New York in 1828. As governor he proposed the safety fund banking system adopted by the legislature in 1829. In March, 1829, he became secretary of state in the administration of President Jackson, but resigned on April 7, 1831. He was appointed minister to England, and arrived in that country in September; but his nomination to the office, submitted to the senate in December, was rejected, on the ground that while secretary of state Mr. Van Buren had instructed the United States minister to England to beg from that country as a favor certain concessions in regard to trade with her colonies in the West Indies, which he should have demanded as a right; and that he had carried our domestic party contests and their results into foreign diplomatic negotiations. This event was followed on May 22, 1832, by the nomination of Mr. Van Buren for the vice presidency by the same democratic national convention which nominated Gen. Jackson for reëlection to the presidency; and in the subsequent election Mr. Van Buren received the electoral votes of all the states which voted for Gen. Jackson, with the exception of Pennsylvania. The democratic national convention which met at Baltimore on May 20, 1835, unanimously nominated him for president. The election in November, 1836, resulted in giving him 170 electoral votes out of 283, 73 being cast for his principal antagonist, Gen. W. H. Harrison, 26 for Hugh J. White, and 14 for Daniel Webster. He was inaugurated March 4, 1837. The country, for some time a prey to pecuniary excitements and embarrassments, was now involved in a crisis of unprecedented severity. Commerce and manufactures were prostrate; hundreds of wealthy mercantile houses in every quarter were bankrupt; imposing public meetings attributed these disasters to the policy of the government; and two months after the president's inauguration the crash was consummated by the universal suspension of specie payments by the banks. On May 15 he summoned an extraordinary session of congress to meet the following September. The president in his special message advised that a bankrupt law for banking and other corporations should be enacted; and that the approaching deficit in the treasury be made good by withholding from the states the fourth and last installment of a previous large surplus ordered to be deposited with them by act of June 23, 1836, and by the temporary issue of $6,000,000 of treasury notes. He also recommended the adoption of what was called the independent treasury system, which was passed in the senate, but was laid on the table in the other house. The payment of the fourth installment to the states was postponed, and the emission of $10,000,000 of treasury notes was authorized. The independent treasury, again recommended in the president's annual message in December, was again rejected by the house of representatives, after it had been passed by the senate. Another presidential measure was more fortunate, a so-called preëmption law being enacted, giving settlers on public lands the right to buy them in preference to other persons. An insurrectionary movement begun in Canada in the latter part of 1837 having found aid and sympathy within our borders, Mr. Van Buren issued two proclamations, enjoining all citizens to refrain from violating the laws and the treaties of the country; and he sent a military force to the frontier under Gen. Scott to preserve the peace there. The closing session of the 25th congress witnessed the temporary stoppage in the house of representatives of the agitation of slavery. Mr. Slade of Vermont introduced the subject in a long and elaborate anti-slavery speech, whereupon the southern members withdrew for separate deliberation, and Mr. Rhett of South Carolina proposed to declare that it was expedient that the Union should be dissolved; but on motion of Mr. Patten of Virginia it was determined by the house that for the future all petitions or other papers touching slavery should be laid on the table without being debated, printed, read, or referred. For this resolution the friends of the president unanimously voted, as did many of his opponents. Van Buren's third annual message, in December, 1839, was largely occupied with financial discussions, and especially with the argument for the divorce of the government from the banks, and for the exclusive "receipt and payment of gold and silver in all public transactions;" that is to say, for the independent treasury. This measure, by which his administration is especially distinguished, became a law on June 30, 1840.—The canvass preliminary to the presidential election of 1840 was begun uncommonly early and with unwonted energy by the opposition. The whig national convention on Dec. 4, 1839, nominated for president William Henry Harrison, and for vice president John Tyler. On the democratic side Mr. Van Buren had no competitor, and he was definitively made the candidate of his party by its national convention on May 5, 1840. Never in the political history of the United States was a canvass conducted amid such absorbing public excitement. The financial distress which had existed more or less oppressively since Mr. Van Buren's inauguration was a standing text for the opposition journals and for the orators who assailed him at monster meetings in every part of the country. Charges of extravagance, of corruption, of indifference to the welfare of the laboring classes, were freely brought against the democratic candidate; while the enthusiasm of the supporters of Harrison was inflamed by log cabins emblematic of his popular origin and habits, by songs, by processions, by assemblages counting tens and hundreds of thousands. The result was the discomfiture of the democrats in every state except Alabama, Arkansas, Illinois, Missouri, New Hampshire, Virginia, and South Carolina. Mr. Van Buren received only 60 electoral votes, while Gen. Harrison had 234; and yet so universal was the participation in the election, that the number of popular suffrages cast for the former was now 1,128,702, or over 367,000 more than had sufficed to secure his return four years previously. His last annual message set forth anew the benefits of the independent treasury system; announced, not without a natural movement of satisfaction, that the country was without either a national debt or a national bank; and concluded with advising the enactment of more stringent laws for the breaking up of the African slave trade.—In 1844 Mr. Van Buren's friends once more urged his nomination for the presidency by the democratic national convention at Baltimore; but he was rejected there on account of his opposition to the annexation of Texas to the Union, avowed in a public letter to a citizen of the state of Mississippi who had called for his opinion on that question. Though a majority of the delegates in the convention were pledged to support him, a rule fatal to this purpose was adopted making the votes of two thirds of the whole number necessary to the choice of a candidate. For several ballots he led all the competitors, when his name was withdrawn from the contest, and on the ninth ballot Mr. Polk was nominated. In 1848, when the democrats had nominated Gen. Cass, and avowed their readiness to tolerate slavery in the new territories lately acquired from Mexico, Mr. Van Buren and his adherents, adopting the name of the free democracy, at once began to discuss in public that new aspect of the slavery question. They held a convention at Utica on June 22, which nominated Mr. Van Buren for president and Henry Dodge of Wisconsin for vice president. Mr. Dodge declined the nomination, and at a great convention in Buffalo on Aug. 9, Charles Francis Adams was substituted. The convention declared that "congress has no more power to make a slave than to make a king;" and that "it is the duty of the federal government to relieve itself from all responsibility for the existence or continuance of slavery wherever the government possesses constitutional authority to legislate on that subject, and is thus responsible for its existence." In accepting the nomination of this new party, Mr. Van Buren declared his full assent to its anti-slavery principles. The result was that in the state of New York he received the suffrages of more than half of those who had hitherto been attached to the democratic party; and that Gen. Taylor, the candidate of the whigs, was elected. After that time Mr. Van Buren remained in private life on his estate at Kinderhook, with the exception of a prolonged tour in Europe in 1853–'5. On the outbreak of the civil war he declared himself decidedly and warmly in favor of maintaining the republic in its integrity. He left a work entitled "Inquiry into the Origin and Course of Political Parties in the United States," which was edited by his sons in 1867. **II. John**, an American lawyer, son of the preceding, born in Hudson, Feb. 18, 1810, died at sea, Oct. 13, 1866. He graduated at Yale college in 1828, studied law, and was admitted to the bar in 1830; was attached to the legation while his father was minister to England in 1831–'2; was elected in February, 1845, by the legislature of New York, attorney general of the state; and after the conclusion of his term of office on Jan. 1, 1847, was a prominent member of the bar in the city of New York. In the presidential canvass of 1848 Mr. Van Buren greatly distinguished himself as a popular advocate of the free democratic party, and of the exclusion of slavery from the federal territories. He afterward returned to the democratic party. In 1866 he made a tour in Europe, and died on his passage homeward.

VANCOUVER, George, an English navigator, born about 1758, died near London, May 10, 1798. He entered the navy in 1771, and served as midshipman in the second and third voyages of Capt. Cook (1772–'5, and 1776–'80). In 1780 he was created a first lieutenant, and after several years' service in the West Indies returned to England in 1789. Some British subjects settled at Nootka having quarrelled with the Spanish officers, Vancouver with a small squadron was commissioned to go thither, and receive the surrender of Nootka under orders from the court of Madrid to the Spanish commandant. He was also to make a survey of the coast northward from lat. 30°, and to ascertain if there was any communication between the coast and Canada by means of lakes, rivers, or inlets. He sailed from England April 1, 1791, and, after an examination of the Sandwich islands, crossed in March, 1792, to the American coast, and secured the surrender of Nootka. He spent the summers of 1792, '3, and '4 in surveying the coast as far N. as Cook's inlet, wintering in the Sandwich islands. On his return he surveyed a large portion of the W. coast of South America, visiting the chief Spanish settlements, and reached England in October, 1795. He spent the rest of his life in preparing an account of his expedition, which at his death he had nearly finished. It was published (3 vols. 4to, London, 1798) with the atlas of the N. W. coast surveys.

VANCOUVER ISLAND, an island in the Pacific ocean, off the N. W. coast of North America, forming part of British Columbia, between lat. 48° 18′ and 50° 55′ N., and lon. 123° 15′ and 128° 30′ W.; length from N. N. W. to S. S. E. about 275 m., greatest breadth about 85 m.; area variously estimated at from 13,000 to 16,000 sq. m.; pop., exclusive of Indians, about 6,000. It is separated from Washington territory on the south and southeast by the strait of Fuca and canal de Haro, and from the mainland of British Columbia on the northeast by the gulf of Georgia, Johnstone strait, and Queen Charlotte sound, which extends N. N. W. from Johnstone strait to the Pacific ocean, being about 75 m. long and 40 m. in greatest breadth. The coast of Vancouver island is much indented, and is lined with numerous islets. The principal inlets are Nootka sound and Barclay or Nitinat sound on the W. coast, Victoria harbor at the S. E. extremity, Esquimalt harbor 3 m. W., and Nanaimo harbor 65 m. N. of Victoria. The city of Victoria is the chief place, and is the capital of British Columbia. The surface is varied by mountains, hills, and prairies; one valley contains as much as 300,000 acres. Through the middle from N. to S. extends a range of bare and rocky mountains, having a general elevation of 2,000 ft., and culminating toward the south in Mt. Arrowsmith, 5,900 ft. high. The shores are abrupt and rocky, and between these and the central ridge are rounded and fir-covered hills. At the bases of the parallel ridges, in the interior, numerous lakes are formed, which are sometimes connected in a continuous chain, sometimes isolated. The only rivers are the short watercourses which discharge the overflow of the lakes or the surface waters of the ridges; in winter they are torrents, in summer nearly dry. Many springs are charged with sulphuretted hydrogen. The central ridge is composed of metamorphic and trappean rocks, fringed by a belt of carboniferous sandstones and other sedimentary rocks. The chief mineral wealth of the island is coal, anthracite and bituminous. The mines at Nanaimo have been successfully worked for some years, the coal finding a ready sale in San Francisco. There is good limestone on the island. Salt springs exist near Nanaimo and on Salt island, but they are not yet utilized. Some of these springs contain 3,446 grs. of salt to the gallon. The climate is equable and healthful, the summers being cool and the winters mild. Spring and summer are dry, autumn and winter wet. The mean temperature at Esquimalt in 1874 was as follows: winter, 38·5°; spring, 53·5°; summer, 56·8°; autumn, 45·9°; year, 48·7°. The highest temperature observed was 78°, the lowest 13·5°. The rainfall was as follows: winter, 7·28 inches; spring, 1·11; summer, 1·51; autumn, 8·9; year, 18·8. The island is well wooded, and spars and lumber are extensively exported. The chief trees are the pine, fir, spruce, oak, willow, alder, cedar, and maple. The Douglas pine preponderates at the south, and is especially valuable for masts. On the banks of the streams and in the valleys and open tracts there is considerable arable land. Wheat, potatoes, turnips, and other vegetables yield abundantly; oats and barley do not succeed so well. The Indians, of whom there are considerable numbers, live chiefly along the coast, and are peaceable. On the wooded promontories of the S. E. end of the island are old structures of which the use is now unknown. They are circles of stone, 3 to 18 ft. in diameter, and are found in groups varying from 3 or 4 to 50 or more. Those that are in a complete shape are filled in to a height of 3 or 4 ft. with masses of loose stones from the erratic bowlders which are strewn over the whole surface of the country. The supposition that these structures were the dwellings of tribes that have now disappeared from the island derives probability from the circumstance that a tribe on the Frazer river now live in similar habitations.—Possession was taken of the island in 1792 in behalf of Great Britain by the navigator Vancouver, to whom it was surrendered by the Spanish commander Quadra. Vancouver explored its coasts, and gave it the name of Quadra and Vancouver, but the first part is no longer used. In 1843 the Hudson Bay company established a trading post at Victoria. The island was long claimed by the United States, but Great Britain was confirmed in her possession by the treaty of 1846. In 1849 it was granted to the Hudson Bay company for ten years. In 1859 it was erected into a colony, and in 1866 it was consolidated with British Columbia.

VANDALIA, a town and the capital of Fayette co., Illinois, on the W. bank of the Kaskaskia river, at the intersection of the Illinois Central and the St. Louis, Vandalia, Terre Haute, and Indianapolis railroads, 65 m. S. E. of Springfield; pop. in 1870, 1,771; in 1875, about 2,100. It is situated in a good fruit and stock region, and has excellent facilities for manufacturing. It contains a woollen mill, plough and carriage factories, a planing mill and furniture factory, two national banks, two public schools, two weekly newspapers, and five churches. Vandalia was the state capital from 1818 to 1836.

VANDALS, an ancient confederacy of barbarous nations of Germanic race. Schafarik considered them a mixed people of Suevi, Slavs, and Celts, and others have held that they were Wends or Sarmatians; but the best authorities classify them as a purely Germanic race, and generally as Goths. They first appeared on the northern coasts of Germany, whence they migrated S., settling in the Riesengebirge, which from them were called Vandal mountains, and subsequently in Pannonia and Dacia. At the beginning of the 5th century A. D. they turned west, traversed Germany, Gaul, and the Pyrenees, and about 410 settled in N. Spain by the side of the Suevi. Shortly afterward they marched further south, and founded a powerful kingdom in ancient Bætica, which took from them its present name Andalusia (Vandalusia). In 429, under Genseric, they crossed over into Africa with a powerful fleet, and, although numbering not more than 50,000, conquered the whole of the northern coast as far as Tunis, and subsequently gained possession also of Sicily, Sardinia, Corsica, and the Baleares. In 455 they sacked Rome. (See GENSERIC.) Having adopted the Arian creed, they persecuted the orthodox Christians. For more than a century they maintained their power in Africa, with Carthage as capital, until it was overthrown by Belisarius, the general of the emperor Justinian, who conquered their last king Gelimer in 534. After this defeat they disappeared from history, but some suppose that descendants of them are still to be found among some of the Berber tribes with blue eyes and blonde hair. Many of the atrocities and cruelties of which the Vandals have been accused are probably fables.

VANDAMME, Dominique, count, a French soldier, born in Cassel, French Flanders, Nov. 5, 1770, died there, July 15, 1830. In 1788 he enlisted in a regiment at Martinique, returned to France in 1790, and in 1792 became commander of the Mont Cassel or Vandamme chasseurs. He distinguished himself in the army of the north (1793–'4), in that of the Rhine (1795–'7), and in most of the campaigns of the republic, the consulate, and the empire. In 1805 the emperor rewarded his services at Austerlitz with the grand cross of the legion of honor, and in 1808 he was made count. In 1809, under Davoust, he covered himself with glory at Eckmühl. Early in 1812 he was placed in command of Westphalian troops against Russia, but his differences with Jerome Bonaparte, his military superior, led to his withdrawal, and he took no part in that campaign. In March, 1813, he was restored to active service on the Elbe. After the French victory at Dresden (Aug. 27) he was ordered by the emperor to resist Schwarzenberg's advance from Bohemia; but he was surrounded by the allies at Kulm, and after a bloody struggle was obliged to surrender (Aug. 30) with three other generals and 10,000 men. (See KULM.) He was a prisoner in Russia till September, 1814, when he returned to France, but was ordered by Louis XVIII. to remain at Cassel. On Napoleon's return from Elba he was made a peer and commander of a corps, with which he contributed to the victory over Blücher at Ligny; and he defeated the enemy at Wavre during the progress of the battle of Waterloo, after which he covered the retreat of the right wing of the army to Paris, and received the thanks of the chambers. Louis XVIII. banished him, and he lived in the United States till the close of 1819, when he returned home; and in 1820 he was restored to his military rank. On Jan. 1, 1825, he retired from the army.—See *Le général Vandamme et sa correspondance*, by Baron P. E. Albert du Casse (2 vols., Paris, 1870).

VANDERBILT, Cornelius, an American capitalist, born on Staten Island, N. Y., May 27, 1794, died in New York, Jan. 4, 1877. He was averse to education, and at the age of 16 bought a boat with which he plied between the island and New York. At 18 he owned two boats and was captain of a third. At 19 he married, removed to New York, and bought boats, sloops, and schooners; and at 23 he was free from debt and worth $9,000. In 1817 he assisted Thomas Gibbons in building the first steamboat ever run between New York and New Brunswick, N. J., and became captain of her at a salary of $1,000 a year. In 1818 he took command of a much larger and better boat on the same line, his wife at the same time keeping the hotel at New Brunswick and making much money. In 1824 Vanderbilt had full control of the Gibbons line, and brought it up to paying $40,000 a year. In 1827, while still superintending the Philadelphia route, he leased for 14 years the ferry between New York and Elizabethport, N. J., put on new boats, and made it very profitable. In 1829 he left Gibbons, and in the following 19 years till 1848 he built and operated steamboats on the Hudson, on Long Island sound, on the route to Boston, and on the Delaware from Bordentown to Philadelphia. He would put on new and superior boats in opposition to an old line, till he was bought off or drove off his competitors so that he had the monopoly and profits. In 1848–'9 he built the steamship Prometheus, in which in 1850 he sailed for the isthmus of Darien. He had already purchased a controlling interest in the "American Atlantic and Pacific Ship Canal Company," which projected a canal across the isthmus; but for this scheme Vanderbilt substituted a transit route from Greytown at the mouth of the San Juan to San Juan del Sur on the Pacific, which had the advantage over the old transit from Chagres to Panama of saving 700 m. between New York and San Francisco. In 1851 he put three steamers on the Atlantic side and four on the Pacific side, and went into competition with the "United States" and the "Pacific Mail" companies. In 1852, with three more steamers, he started a branch line from New Orleans to Greytown. In 1853 he went to Europe in his steam yacht North Star, and while he was abroad C. K. Garrison and Charles Morgan, holding a large amount of the transit stock, threw him out of the management. On his return he organized an opposition line to Morgan's between New Orleans and Galveston, and in 1854 established an independent line between New York and Aspinwall, with steamers on the Pacific side to compete with the Pacific mail line. He soon compelled a compromise, and once more held the control of the transit company. In 1856 William Walker, then ruling in Nicaragua, seized the property of the transit company, and Vanderbilt, with the assistance of Costa Rica, fomented an insurrection which expelled Walker. The bar at the mouth of the San Juan rendered approach to Greytown difficult, which led to the abandonment of the transit business. In April, 1856, Vanderbilt received a large subsidy for withdrawing his California line, the field not affording profit for two companies. His independent transatlantic line, started in 1855, was abandoned in 1861 by the withdrawal of the Vanderbilt, a steamer costing $800,000, which Vanderbilt gave to the government on the outbreak of the civil war. During his steamship career he owned 21 steamers, 11 of which he built, and with steamboats his entire steam fleet numbered 66; and for many years he had been popularly known as the "Commodore." When he abandoned the water in 1864 his accumulations were estimated at $40,000,000. As early as 1844 he had become largely interested in the New York and New Haven railroad, and in 1845 he began to buy the stock of the Harlem railroad, and in 1864 held the whole of it. In 1859 and subsequently he invested several millions in the mortgage bonds of the Erie road. Soon after coming into possession of the Harlem road he secured a controlling interest in the Hudson River and New York Central railroads, and consolidated the two. From 1873 the Lake Shore and Michigan Southern was operated in conjunction with the New York Central and Hudson River roads as one continuous route 978 m. in extent, and with the Harlem and side lines and branches presenting an aggregate of 2,128 m. subject to one management, representing an aggregate capital of $149,000,000, half of which was said to belong to Vanderbilt and his family. He gave a liberal sum of money for education in the south. (See VANDERBILT UNIVERSITY.)

VANDERBILT UNIVERSITY, an institution of learning in the western suburbs of Nashville, Tenn. It was chartered in 1872 as the Central university of the Methodist Episcopal church, South, but the efforts to raise funds for its organization were unsuccessful. In 1873 Cornelius Vanderbilt of New York gave to the enterprise $500,000, and the institution was named in his honor. He has since increased this amount to nearly $700,000, $300,000 of which is to remain as a permanent invested endowment. One of the conditions upon which this gift was made was that Bishop McTyeire of the Methodist Episcopal church, South, should become president of the board of trust. This post was accepted by Bishop McTyeire, upon whom has fallen the chief responsibility of organizing the institution. L. C. Garland, LL. D., was chosen chancellor, and the Rev. T. O. Summers, D. D., dean of the theological faculty, and *ex officio* vice chancellor. A plot of 75 acres was purchased, the corner stone of the university was laid April 28, 1874, and on Oct. 4, 1875, the institution was opened for students. It has a theological department with four professors, a law department with three, a medical department with eleven, and a department of philosophy, science, and literature with eleven. The total number of students in 1875-'6 was 300. It has a library of 6,000 volumes, scientific apparatus that cost more than $50,000, and extensive geological and mineralogical cabinets. The plan of instruction is elective. The dormitory system is not used; students board in private families. Tuition is free to all in the theological department, and in the literary and scientific department to all preparing for the ministry.

VANDERBURGH, a S. W. county of Indiana, bounded S. by the Ohio river; area, 216 sq. m.; pop. in 1870, 33,145. The surface is generally undulating and the soil very fertile. Bituminous coal is found in abundance. The county is traversed by the Wabash and Erie canal, and by railroads intersecting at Evansville. The chief productions in 1870 were 180,645 bushels of wheat, 553,925 of Indian corn, 56,361 of oats, 13,318 of barley, 54,842 of potatoes, 115,502 lbs. of butter, 167,150 of tobacco, and 9,852 tons of hay. There were 2,856 horses, 1,185 mules and asses, 3,254 milch cows, 2,368 other cattle, 3,157 sheep, and 12,223 swine. The number of manufacturing establishments was 281; capital invested, $3,308,600; value of products, $5,341,517. The chief manufactories were 5 of agricultural implements, 17 of clothing, 2 of cotton goods, 8 of furniture, 10 of iron, 10 of machinery, 19 of tobacco, 3 flour mills, 5 tanneries, 5 currying establishments, 4 planing mills, 8 saw mills, 8 breweries, and 1 woollen mill. Capital, Evansville.

VAN DER GOES. See GOES.

VAN DER HEYDEN, Jan, a Dutch painter, born at Gorkum in 1637, died in Amsterdam, Sept. 28, 1712. He excelled in landscapes, and in painting public buildings and churches, but not in figures, which were added by other artists, chiefly by Adrian Vandervelde. His works include "The London Exchange," the new market and other objects in Amsterdam and Rotterdam, "The Calvary at Cologne," "A Village on the Banks of a River," and "A Street of Rome." The government pensioned him for improvements in fire engines.

VAN DER HOEVEN. See HOEVEN.

VANDERLYN, John, an American painter, born in Kingston, Ulster co., N. Y., in October, 1776, died there, Sept. 23, 1852. Removing to New York at the age of 16, he received instruction in painting from Gilbert Stuart, and in 1796 visited Paris, where he studied five years. He again resided in Europe in 1803–'15, and painted "The Murder of Jane McCrea by the Indians," "Ariadne," a picture very celebrated in its time, and "Marius Sitting among the Ruins of Carthage," which received the gold medal at the Paris exhibition of 1808. After his second return to America, he painted portraits of Madison, Monroe, Clinton, and Calhoun. He was long engaged in superintending the exhibition of panoramic views in a building called the rotunda, erected by himself in the city hall park, New York, which involved him in pecuniary difficulties. Among his remaining pictures are a portrait of Washington for the hall of representatives at Washington, and "The Landing of Columbus," painted for one of the compartments of the rotunda in the national capitol. His last work was a portrait of President Taylor.

VAN DER MEER. I. Jan, the elder, a Dutch painter, born about 1625, died about 1685. He studied in Utrecht and Rome, and became dean of the painters in Amsterdam. He painted the portrait of the prince of Orange, who appointed him comptroller of canal tolls. He excelled in landscapes, sea pieces, and battles, and was distinguished by a brilliancy of coloring not unlike that of Claude Lorraine. **II. Jan,** the younger, son of the preceding, born in Haarlem about 1660, died there about 1704. He was a successful follower of Berghem. His works are seldom to be met with out of Holland. The best is a "View of the Rhine."

VAN DER MEULEN. See Meulen.

VANDERVELDE, or Vandevelde. I. Adrian, a Dutch painter, born in Amsterdam in 1639, died there in 1672. He excelled in figures, and was frequently employed by Ruysdael, Hobbema, Van der Heyden, and other artists, to complete their pictures. **II. Willem,** the elder, a Dutch painter, born in Leyden in 1610, died in London in 1693. He was so distinguished by his drawings of sea fights that the states of Holland provided him with a small vessel for the purpose of following the Dutch fleets and illustrating their manœuvres. In 1675 he was invited by Charles II. to England, and was appointed painter of sea fights to the king, with a pension of £100, which was continued by James II. **III. Willem,** the younger, son of the preceding, born in Amsterdam in 1633, died in London, April 6, 1707. He succeeded his father as marine painter to the king of England, where his pictures are chiefly owned. He was unrivalled in storm pieces.

VAN DIEMEN'S LAND. See Tasmania.

VANDYKE, or Van Dyck, Sir Anthony, a Flemish painter, born in Antwerp, March 22, 1599, died in London, Dec. 9, 1641. He was the most illustrious pupil of Rubens, and finally surpassed him in elegant portrait painting. After visiting England, he went in compliance with the advice of Rubens to Venice, and thence to Genoa and Rome. In both cities he received abundant commissions for portraits, and in the latter produced a fine head of Cardinal Bentivoglio, esteemed one of his masterpieces, besides many altarpieces. In 1627 he returned to Antwerp with a high reputation, and soon after executed for the church of the Augustinians there a celebrated picture representing St. Augustine in ecstasy, supported by angels. For the next five years he was busily employed by ecclesiastical establishments and private patrons in the Netherlands; and to this period may be ascribed numerous "Crucifixions" and "Pietas," impressed with that character of profound sorrow for which he has always been distinguished. Preëminent among them is his altarpiece of the crucifixion in the cathedral at Mechlin, which Reynolds pronounced "one of the finest pictures in the world." The close imitation of Rubens which at first characterized his works was now replaced by a peculiar style in which gracefulness of contour, softness of coloring, and an expression of a deeper and more touching emotion are the distinguishing traits. But his greatest reputation was won by his portraits, which probably led to his being in 1632 invited by Charles I. to England. Soon after his arrival he was knighted, and in 1633 a life pension of £200 was granted to him. "He always," says a contemporary writer, "went magnificently dressed, had a numerous and gallant equipage, and kept so good a table in his apartment that few princes were more visited or better served." Excessive application (it is said that he frequently painted a portrait in a day) and a too lavish indulgence in dissipation, together with the anxieties caused by a search for the philosopher's stone, rapidly undermined his health; and with the desire of repairing his shattered fortunes, he proposed to the king to paint the walls of the banqueting room at Whitehall, but died before completing the bargain for the work. The number of works of all classes attributed to him is enormous, in view of his short life, and of the circumstances under which the last ten years of it were passed. The best of his portraits are in England, prominent specimens being his several portraits of Charles I., those of the earls of Strafford and Pembroke, and many others in the collections at Windsor castle, Hampton court, Blenheim, Althorp, and other famous seats. There are also many in the galleries of Paris, Berlin, and Vienna. A series of 100 small portraits in chiaroscuro of the most eminent of his contemporaries, from which etchings have been made, was executed by him in Antwerp, and is very celebrated. His long lost "Madonna with the Child" is said to have been discovered in 1875 in a German cloister by the Flemish painter George van Haanen. He was buried in St. Paul's cathedral, near the tomb of John of Gaunt.—See "Memoir of Sir A. Van Dyck," with a descriptive catalogue of his etchings, by W. H. Carpenter (4to, London, 1844).

VANE, Charles William Stewart. See LONDONDERRY, MARQUIS OF.

VANE, Sir Henry, an English statesman, governor of the colony of Massachusetts, born in 1612, executed on Tower Hill, London, June 14, 1662. He was the son of Sir Henry Vane the elder, who filled some of the highest state offices during the reigns of James I. and Charles I. He was educated at Westminster school, and was entered at Magdalen college, Oxford; but before matriculation he became alienated from the church of England, and refused to take the oath of allegiance. He visited Holland, France, and Geneva, and then resolved to join the Puritans in Massachusetts. He reached Boston in 1635, and in 1636 was elected governor; but he gave offence by taking part in a bitter religious controversy. He avowed friendship for the principles of civil and religious liberty, and objected to the attacks on Mrs. Hutchinson, many of whose opinions he adopted. An opposition under the lead of Winthrop was organized against him, and in the annual election in 1637 he was defeated; but he was immediately chosen a representative to the general court. The majority of that body declared the election of Vane and his associates void, and they were returned a second time on the next day. In order to put down the Hutchinsonian heresy, a law was passed by the general court that no strangers should be received within the jurisdiction of the colony except by permission of a magistrate. This created such public discontent that Governor Winthrop felt obliged to put forward a "Defence," to which Vane replied in a pamphlet. In August, 1637, he returned to England. In 1640 he was elected a member of parliament from Kingston-upon-Hull, and received in conjunction with Sir William Russell the office of treasurer of the navy. In June of this year he was also knighted. After the dissolution of parliament he was reëlected from the same place to the long parliament. He was a zealous opponent of the royalist party, and after war had broken out between the king and parliament he gave up to the latter the fees of his office of treasurer of the navy, amounting to £30,000 a year. In June, 1643, he was sent to Scotland as one of the commissioners to negotiate an alliance, and by his persuasion the "Solemn League and Covenant" was adopted. During the progress of the war Vane was placed on all commissions empowered to treat with the king, and was also one of the parliament's committee which occasionally accompanied the army. When in 1648 the house of commons discussed the terms of settlement offered by the king, he led the minority which favored their rejection. Disapproving of the "purge" of the parliament which Cromwell effected, he retired to private life. In February, 1649, he became a member of the council of state, and in this position had almost the exclusive direction of the navy and the conduct of foreign wars. He was also at the head of a committee which reported a bill for parliamentary reform, and it was at this period that Milton wrote in his praise one of the finest of his sonnets. The forcible dissolution of the long parliament by Cromwell in April, 1653, brought him into open conflict with that leader. He retired to his estate at Raby castle, and employed himself in writing a theological work, "The Retired Man's Meditations, or the Mysterie and Power of Godliness" (4to, 1655). He also published a political work in the form of a letter to one of the protector's council, and on the occasion of the fast declared by Cromwell in March, 1656, wrote a tract entitled "A Healing Question propounded and resolved." This was adjudged seditious, and for it and his opposition to the course of the protector he was arrested, but was speedily released. While in prison he published a political letter to Harrington, and a work entitled "Of the Love of God, and Union with God." Subsequently efforts were made to induce him to support the protector, but he remained an inflexible republican. After the death of Cromwell he was elected to the parliament of 1659, and was there the leader of the republican party. When the long parliament was again assembled Vane was appointed one of the committee of safety, and subsequently president of the council of state. On the restoration of the Stuarts he was arrested and sent to the tower, and was one of the 20 excepted out of the act of general pardon and oblivion. After an insurrection of the fifth monarchy men he was removed from one prison to another, and at last confined in a castle on one of the Scilly isles, where he remained for two years, spending his time in writing, chiefly on theology. In August, 1660, the lords and commons unitedly petitioned that "if he were attainted, yet execution as to his life might be remitted." But in July, 1661, the commons ordered proceedings against him according to law. He was consequently removed to the tower of London, and on June 2, 1662, arraigned before the court of king's bench. He was brought in guilty, but according to the king's promise the sentence was to be remitted. The courageous bearing of the prisoner alarmed Charles, and after the trial he wrote a letter to the chancellor, saying that if Vane had given new occasion to be hanged, he was certainly too dangerous a man to let live, if he could be honestly put out of the way. Vane suffered the following week; but instead of being hanged, he was beheaded. His bearing was dignified and manly; and in order to prevent him from exciting sympathy, trumpeters were employed to drown his dying speech. It was through his influence that the charter for the Rhode Island colony was procured, and Roger Williams declared that his name ought ever to be held in honored remembrance by her people. Vane's only son was knighted by Charles II.—His life has been written by C. W. Upham, in Sparks's "American Biography."

VAN ERPEN, Thomas. See Erpenius.

VAN EYCK. See Eyck.

VAN HELMONT. See Helmont.

VANILLA (Span. diminutive of *vaina*, a sheath, the pods being supposed to resemble in shape a little knife sheath), the botanical name of a genus of orchids, and the popular name of the fruit or pods of the plant. The species, of which there are but a few, are all climbing plants (an unusual habit with orchids), their slender stems emitting aërial roots by means of which they climb upon and ramble among the branches of trees; the fleshy leaves are heart-shaped at base, and their flowers, which are thick, fleshy, dull-colored, and inodorous, are produced upon small lateral branches; the fruit, when fresh, is about the size of the little finger, somewhat three-cornered, fleshy, firm, smooth, and plump; when cut open it exudes an inodorous slimy juice, which contains numerous spiculæ of oxalate of lime, which have an irritating effect upon the skin; the interior is one-celled, with 12 longitudinal ridges upon the walls, upon which the minute seeds are borne. The most important species is *V. planifolia*, a native of the warmer parts of Mexico, and introduced into Central and South America, and also various parts of the East Indies by cultivators; it requires a warm, moist atmosphere, and can only be cultivated in localities presenting these conditions. Vanilla is propagated by tying a shoot about 3 ft. long to the base of a tree; the plant comes into bearing in three years, and will continue to be productive for 30 or 40 years. The natural conditions have been imitated under glass, and pods of superior quality have been produced in Europe. When quite ripe the pods split longitudinally into two unequal valves, and they are therefore gathered before complete maturity; the drying of the pods is a long process, consisting of alternate wrapping in woollen cloths and heating, and exposing to heat uncovered, a manipulation which develops their peculiar odor and gives them a dark brownish color; they are also oiled in the course of curing. Like those of most other orchids, the flowers of vanilla depend upon insects for aid in fertilization; for a long time the plants, while they grew vigorously and flowered freely in the East Indies, produced no fruit, the proper insect not being present, and fertilization in those countries is now performed artificially. The vanilla pods (or beans as they are popularly called), as found in the shops, are like fleshy flexible sticks, 3 to 8 in. long, $\frac{3}{10}$ to $\frac{4}{10}$ in. wide, flattened, and narrower and hooked at the stalk end; the surface is furrowed lengthwise, and is often covered with minute crystals; within are found innumerable, minute, shining black seeds, imbedded in an aromatic viscid pulp. The odor and flavor of vanilla are peculiar, and to most persons highly agreeable; it belongs to the same class of odors with those of melilot, vernal grass, and Tonqua bean, but is distinct from each. The odor is not due to a volatile oil, but to a crystallizable principle, vanilline, which, having very slight acid properties, has been by some chemists termed vanillic acid; about 1 per cent. is contained in the pods, either as crystals or dissolved in the viscid liquid which surrounds the seeds; it is soluble in ether and alcohol, especially when warm, in boiling water, in fatty and volatile oils, and in alkaline solutions. An interesting fact connected with vanilline is that of its artificial production; Tiemann and Haarman of Berlin in 1874 succeeded in converting coniferine, found in the sap of pines, by means of chemical agents, into vanilline.—The principal supplies of vanilla come from Vera Cruz and Tampico. Its use is that of a condiment or flavoring material, and as such it was known to the Mexicans before the visits of the Spaniards, the natives employing it, as is done at the present day, to mix with chocolate. It was long in use in Europe before its origin was known. In flavoring chocolate it is ground up with the seed, but for candies, ice cream, and cookery, it is most generally employed in the form of an extract; this is prepared by cutting the pods into small pieces, thoroughly triturating them with sugar, then digesting with diluted alcohol, and afterward percolating. Much of the extract is adulterated with Tonqua bean and the cheaper kinds are made solely from that; one familiar with the peculiar and delicate odor of vanilla can detect any admixture of this kind by the smell. It has been said that in all the cases where poisoning has taken place from ice cream vanilla has been the flavor employed. It is supposed by Schroff that in these cases the extract has been prepared from parcels of the drug which have been besmeared with cashew-nut oil.—Wild vanilla is a name given to a *liatris* (*L. odoratissima*), also called hound's-tongue and deer's-tongue, a species of this showy genus found in most of the south-

Vanilla planifolia.

ern states, but especially abundant in the swampy pine woods of Georgia and Florida; it has broad spatulate leaves, those at the base 8 to 12 in. long by 2 or 3 in. broad, and a large branching panicle of heads of purple flowers. The fresh leaves have an unpleasant odor, but in drying a large amount of coumarine is developed (see Tonqua Bean), and they then possess a very strong fragrance. The leaves are collected in large quantities in Florida, and are shipped to northern ports and to Europe; they are used to scent smoking tobacco and snuff, by being cut or ground up with them, and are laid among cigars for the same purpose.

VANINI, Lucilio, an Italian philosopher, born at Taurisano about 1585, burned at the stake in Toulouse, Feb. 19, 1619. After studying at Rome and Padua, he entered holy orders, taught at Geneva, Paris, and Lyons, was obliged to flee to England, where he defended Roman Catholicism, and was imprisoned for some time. He next went to Genoa, and thence to Lyons, where in 1615 he published his *Amphitheatrum Æternæ Providentiæ*, a curious argument against various forms of atheism, which however caused him to be suspected of a desire to spread atheistic doctrines. In Paris appeared in 1616 his volume of dialogues *De Admirandis Naturæ, Reginæ Deæque Mortalium, Arcanis*, which after being sanctioned was burned by order of the Sorbonne. He soon after removed to Toulouse, where his erudition and eloquence attracted numerous pupils, including the children of the president of the parliament. He was nevertheless, after a trial of six months, sentenced to death by the parliament as a free-thinker, despite his submission to the church.—See *La vie et les sentiments de L. Vanini*, by David Durand (Rotterdam, 1717), and *Œuvres philosophiques de Vanini*, by Rousselot (Paris, 1841).

VAN LENNEP. See Lennep.

VANLOO. I. Jean Baptiste, a French painter, born in Aix, Provence, Jan. 14, 1684, died there, Dec. 19, 1745. He was descended from a family of Dutch painters, and found a patron in the prince of Carignano at Turin, who enabled him to study in Rome, and in 1719 presented him in Paris to the regent duke of Orleans, who employed him extensively. This made his fortune as a portrait painter, and he also excelled in other departments of art; and he became a teacher in the academy. From 1738 till about 1740 he was in London, where according to Walpole he "bore away the chief business from every other painter." **II. Charles André,** better known as Carle Vanloo, brother of the preceding, born in Nice in 1705, died in Paris in 1765. He enjoyed a great reputation as a painter of history and portraits. In 1761 he was appointed director of the French academy of fine arts, and in 1762 painter to the king. His son César succeeded him as director, and two of his nephews, Louis Michel and Charles Amédée Philippe, became first painters to the kings of Spain and Prussia.

VANNES (anc. *Civitas Venetorum*), a town of France, capital of the department of Morbihan, near the lagoon of Morbihan, on the S. coast of Brittany, 61 m. N. W. of Nantes; pop. in 1872, 14,690. It is the seat of a bishop, and has a massive cathedral, a theatre, a school of navigation, a communal college, two ecclesiastical seminaries, and manufactories of woollens, cottons, linens, lace, and leather. The port only admits small vessels, but the coasting trade is considerable.

VANNI, Francesco, an Italian painter, born in Siena about 1565, died there, Oct. 25, 1609. He brought himself into general notice by a picture of St. Peter rebuking Simon Magus, for which he was knighted by Pope Clement VIII.; and thenceforth he lived at Siena, where his best works are still to be found. His style resembles that of Federigo Baroccio.

VANNUCCI, Pietro. See Perugino.

VAN OORT, Adam. See Oort.

VAN OOST. I. Jacob, the elder, a Flemish painter, born in Bruges about 1600, died there in 1671. He studied in Italy, and became an imitator of Annibale Carracci. He executed for the churches of Bruges an immense number of pictures, prominent among which is his "Descent from the Cross" in the church of the Jesuits. **II. Jacob,** the younger, son of the preceding, born in Bruges in 1637, died there, Dec. 29, 1713. He was educated in Italy, and settled in Lille. He became known as a historical painter, and excelled in portraits.

VAN OOSTERZEE, Jan Jacob, a Dutch theologian, born in Rotterdam in 1807. He was educated at the university of Utrecht, studied theology, and entered the ministry of the Reformed church. He became pastor at Eemnes and at Alkmaar, and in 1844 was called to the charge of the principal church in Rotterdam; this post he occupied for 18 years, and established his reputation as the ablest pulpit orator and divine in the Reformed church in Holland. In 1862 he was appointed professor of systematic and practical theology at Utrecht. He has written in Dutch: "Image of Christ as presented in Scripture;" "Life of Jesus;" "Christology, a Manual for Christians who desire to know in whom they believe;" "John's Gospel, Apologetic Lectures;" "Theology of the New Testament;" and "Christian Dogmatics." For Lange's *Bibelwerk* he wrote commentaries on the Gospel of St. Luke, the pastoral epistles, and the Epistles to Philemon and of St. James. Several of his works have been translated into other languages; his commentaries, "Theology of the New Testament" (1870), and "Christian Dogmatics" (1874) into English. Van Oosterzee is also the founder and editor, with Doedes, of the "Dutch Annals of Scientific Theology."

VAN OS, Pieter Gerard, a Dutch painter, born at the Hague in 1776, died there in 1839. He formed his style after Paul Potter and Dujardin, and became eminent for his landscapes, with cattle. He served in 1813-'14 as a cap tain of volunteers, and excelled in military subjects, and in etchings from his own designs.

VAN RENSSELAER. I. Stephen, known as "the patroon," an American statesman, born in New York, Nov. 1, 1764, died in Albany, Jan. 26, 1839. He was the fifth in lineal descent from Kiliaen Van Rensselaer, the original patroon or proprietor of the "colonie of Rensselaerswyck," who in 1630 and subsequently purchased land, which in 1637 formed a tract of 48 m. by 24, extending from the immediate vicinity of Fort Orange (now Albany) over the greater part of the present counties of Albany, Rensselaer, and Columbia. His mother was Catharine, daughter of Philip Livingston. He entered Princeton college, but owing to the proximity of the British army removed to Harvard college, where he graduated in 1782. In 1783 he married a daughter of Gen. Philip Schuyler. He was a member of the house of assembly of the state in 1789, and of the senate from 1790 to 1795, when he was chosen lieutenant governor, which office he filled for six years. He presided over the constitutional convention of 1801, and in 1810–'11 he was one of the commissioners for exploring the route and considering the feasibility of a western canal. He was made commander of the cavalry of the state with the rank of general in 1801; and in 1812, in command of the New York militia, he assaulted and took Queenstown, Canada, but was ultimately defeated by the refusal of the militia to go out of the state, whereupon he resigned. After the war he devoted his energies, in connection with De Witt Clinton, to the prosecution of the Erie canal, and from 1816 till his death was one of the board of canal commissioners, and for 15 years its president. He was again a member of the legislature in 1816; in 1819 was elected a regent of the state university, and subsequently its chancellor; in 1820 president of the agricultural board of the state; and in 1821 a member of the constitutional convention. Under his direction and at his expense, geological surveys were made by Prof. Amos Eaton of Albany and Rensselaer counties and along the line of the Erie canal in 1821–'3, and the reports published in 1824. He also employed Prof. Eaton to deliver familiar lectures on natural science through the state. In November, 1824, he established at Troy a scientific school, which was incorporated in 1826 as the Rensselaer polytechnic institute. Fully half of its current expenses were borne by him, and he continued to aid it till his death. He was a member of congress in 1822–'9, and his vote secured the election of John Quincy Adams as president. In 1825 Yale college conferred on him the degree of LL. D.—See "A Discourse of the Life, Services, and Character of Stephen Van Rensselaer, with an Historical Sketch of the Colony and Manor of Rensselaerwyck," by Daniel D. Barnard (8vo, Albany, 1839). **II. Solomon,** an American soldier, a relative of the preceding, born in Rensselaer county, N. Y., Aug. 6, 1774, died in Albany, April 23, 1852. He entered the army in 1792, and as captain took part in the battle of Miami, where he was severely wounded. In 1800 he left the service, but was adjutant general of the New York militia for several years subsequently. In 1812 he was lieutenant colonel of volunteers, and in the assault on Queenstown heights was again seriously wounded. In 1819–'22 he was a member of congress. In 1836 he published a "Narrative of the Affair at Queenstown." **III. Cortland,** an American clergyman, son of Stephen, born in Albany, May 25, 1808, died in Burlington, N. J., July 27, 1860. He graduated at Yale college in 1827, and was admitted to the bar in 1830; but he soon afterward entered the theological seminary at Princeton, was ordained in 1835, and commenced preaching in Virginia. In 1837 he became pastor of the first Presbyterian church in Burlington, N. J., and the same year corresponding secretary of the board of education of the general assembly of the Presbyterian church, both of which offices he filled till his death. He founded the "Presbyterian Magazine," and there is a posthumous volume of his "Essays and Discourses, Historical and Practical" (12mo, Philadelphia, 1861).

VAN SCHENDEL, Petrus, a Belgian painter, born in Breda in 1806. He studied at the academy of Antwerp, and settled in Brussels. Among his best works are market scenes and interiors, contrasting the effects of moonlight and fire light or lamp light.

VANSITTART, Nicholas, Lord Bexley, an English statesman, born in London, April 29, 1766, died in Kent, Feb. 8, 1851. His father, who was governor of Bengal, perished at sea on the voyage to India in 1771. Nicholas graduated at Oxford, and was called to the bar in 1791. From 1796 to 1802 he represented Hastings in parliament. From 1804 he held successively the offices of Irish secretary, secretary to the treasury, and chancellor of the exchequer till 1823, when he was raised to the peerage as Baron Bexley. He was chancellor of the duchy of Lancaster till 1828, when he retired on a pension of £3,000. In default of issue his title became extinct at his death.

VAN SWIETEN. See Swieten.

VAN VEEN, or Venius, Otho, a Flemish painter, born in Leyden about 1550, died in Brussels about 1630. He studied painting in Italy, entered the service of Alessandro Farnese, governor of the Netherlands, at Brussels, and for some years conducted an academy at Antwerp, in which Rubens received his first instruction. His chief works are in the churches of Antwerp and Brussels. He published a "History of the War of the Batavians" from Tacitus, illustrated from his own designs.

VANVITELLI, Luigi, an Italian architect, born in Naples in 1700, died there, March 1, 1773. He was the son of Caspar van Witel, a painter of Utrecht who settled in Italy. He early executed fresco and oil paintings, but afterward devoted himself to architecture, and designed several churches in Urbino, a new port for Ancona, and many religious edifices. In 1725 the pope appointed him architect of St. Peter's, for the protection of the cupola, of which he designed several supports of iron; and he built the vast Augustinian convent at Rome. Subsequently he became architect to Charles III., king of Naples, for whom he constructed a palace and aqueduct at Caserta, and other fine works.—See *Vita di Luigi Vanvitelli*, by L. Vanvitelli (Naples, 1823).

VAN WERT, a N. W. county of Ohio, bordering on Indiana, drained by the St. Mary's and tributaries of the Auglaize river; area, 390 sq. m.; pop. in 1870, 15,823. The surface is level and mostly covered with a heavy growth of valuable timber. The soil is a rich loam resting on a substratum of blue marl. The Miami canal passes along the E. border of the county, which is intersected by the Pittsburgh, Fort Wayne, and Chicago railroad. The chief productions in 1870 were 146,719 bushels of wheat, 25,763 of rye, 162,280 of Indian corn, 90,379 of oats, 35,617 of potatoes, 57,781 lbs. of wool, 270,789 of butter, and 14,799 tons of hay. There were 4,364 horses, 4,340 milch cows, 5,202 other cattle, 19,780 sheep, and 12,945 swine; 2 flour mills, 1 iron foundery, 3 tanneries, 18 saw mills, 1 machine shop, and 2 woollen mills. Capital, Van Wert.

VAN ZANDT, a N. E. county of Texas, bounded N. E. by the Sabine river, and drained by affluents of the Sabine, Neches, and Trinity; area, 875 sq. m.; pop. in 1870, 6,494, of whom 682 were colored. The surface is undulating and the soil fertile. About one third is prairie, and the rest timbered. The chief productions in 1870 were 194,879 bushels of Indian corn, 29,935 of sweet potatoes, 4,088 lbs. of wool, and 2,926 bales of cotton. There were 2,422 horses, 15,179 cattle, 2,406 sheep, and 17,300 swine. Capital, Canton.

VAPEREAU, Louis Gustave, a French author, born in Orleans, April 4, 1819. He studied at the normal school, and in 1842 was secretary to Victor Cousin, whom he assisted in his work *Pensées de Pascal.* From 1843 to 1852 he was professor of philosophy in the college at Tours, being half of the time also professor of German. In 1852, when restrictions were imposed upon philosophical instruction in colleges, he settled in Paris as a private teacher and as a writer. In 1854 he was admitted to the bar, and became the chief editor of the *Dictionnaire universel des contemporains*, editions of which appeared in 1858, 1861, 1865, and 1870, the last in 1888 double-column pages (supplement, 1873).

VAPORIZATION, the conversion of the particles of liquids, and in some instances of solids, into a gaseous condition. When the action takes place from the surface, it is called evaporation; when from the interior of the mass, ebullition. Evaporation takes place at all temperatures with most liquids, but there are some which cease to give off vapor at reduced temperatures; thus if two vessels, one containing oil of vitriol and the other a solution of chloride of barium, are placed together under the exhausted receiver of an air pump, no precipitate of barium will be produced in the latter vessel, showing that no sulphuric acid has evaporated. Most solids before passing into vapor become liquid; but several, as iodine and camphor, pass immediately from the solid to the vaporous condition. Ebullition differs remarkably from evaporation, and with a few exceptions always takes place in a given liquid, subjected to the same external pressure, at the same temperature. (See BOILING POINT, and EVAPORATION.) The amount of vaporization which will take place from any liquid will depend upon its molecular composition, its temperature, and the space in which it is confined. The laws of vaporization are conveniently studied by observing the formation of vapor in the upper end of a barometer tube. A glass tube from 36 to 40 in. long and half or three quarters of an inch in diameter, closed at one end and filled with mercury, may be inverted in a reservoir of that liquid, when the column will fall until it is balanced by the pressure of the atmosphere, and a vacuum will exist in the upper part of the tube. If now a drop or two of sulphuric ether is passed into its mouth, it will on arriving at the surface of the mercurial column meet with no resistance to the vaporization of its particles, and it will consequently fill the previous vacuum, and produce by its expansion a pressure on the surface of the mercurial column, which will therefore fall to such an extent that its weight, added to that of the force of expansion of the ether vapor, will balance the pressure of the atmosphere. The introduction of one or two drops more will cause a further fall of the mercurial column, until after several repetitions the depression of the column will cease, but simultaneously there will be a collection of fluid ether at the surface of the mercury and on the sides of the tube, and no drop of ether subsequently introduced will suffer vaporization unless the temperature is increased. If, however, the tube is warmed, the tension of the ether vapor will be increased; and if the process is continued a point will be reached where all the mercury will be expelled from the tube, and the latter will be filled with the vapor of the ether, the tension of which will then be equal to that of the atmosphere. The temperature at which this takes place is the boiling point of the ether. The ether at any stage of the experiment will boil at the temperature it may have attained when the pressure upon its surface is equal to that which it sustains under the circumstances, viz., the difference between the column in a barometer and that in the experimental tube. For instance, if the column in the latter is 22 in. while the barometer marks 30 in., then the ether, at the temperature to which its vapor has been raised, will boil when sustaining an atmospheric pressure equal to a mercurial column 8 in. high. If the experiment is varied by depressing the tube in the reservoir, it will be seen that, although at the beginning nothing but the invisible vapor of ether occupied the upper part of the tube, when the degree of depression is sufficient, liquid ether will make its appearance. Until this point is reached the mercury will continue to descend to a lower level during the depression of the tube; but as soon as the condensation of vapor into liquid ether begins, the mercury will remain at the same level until all the vapor is condensed, and the upper portion of the tube is filled with liquid ether. When the tube is raised, the mercury will continue to stand at the same level as long as there is any liquid ether in the upper part; but as soon as it all vaporizes, the mercury will begin to rise, and continue to do so with the elevation of the tube. When such a quantity of vapor is contained in a space that it cannot be condensed, the temperature remaining the same, without a portion passing into the liquid state, it is said to be saturated for that temperature. A certain volume of saturated vapor, therefore, when it is heated, ceases to be saturated, and when exerting a pressure equal to that of the atmosphere does not represent the boiling point of the liquid; this it does only at the points of saturation and of equal pressure. (The boiling points of alcohol, ether, water, and other fluids are given in Boiling Point, vol. ii., pp. 793 and 796.) The condition of saturation of a vapor is therefore that of its maximum tension at the same temperature, since it cannot be compressed with partial condensation into a liquid. The more a vapor is removed from its saturation point, either by expansion or by increase of temperature, the more nearly does it resemble in physical properties a permanent gas; and it has therefore been concluded that the so-called permanent gases are only vapors which exist at ordinary temperatures far above their points of saturation, and that by simultaneously lowering their temperature and subjecting them to pressure they could be reduced to a point below that of saturation, and therefore that they could be partially liquefied. In many instances experiment has verified the correctness of this conclusion, as in the liquefaction of nitrous oxide, carbonic anhydride, ammonia, and several other gases. (See Heat, vol. viii., p. 578.) The passage of a vapor into a vessel containing a permanent gas, or into the atmosphere, follows the laws of the diffusion of gases (see Gas, vol. vii., p. 633), and it is found that the combined tension of the gas and the vapor is nearly equal to the sum of the separate tensions of the gas and vapor, when contained in the same space at the same temperature. This is indicated in the increased tension of the atmosphere when it contains a more than usual quantity of invisible watery vapor, and in its diminished tension when such invisible vapor begins to condense and form clouds, as evidenced in the fall of the barometer. The vaporization of liquids under circumstances in which their surfaces are not in contact with the air or any gaseous space, as when water globules are enveloped in oil, presents many remarkable phenomena, some of which are described and explained in the article Boiling Point, as also the effect which substances in solution have upon the vaporization of liquids, as well as the relation of the chemical constitution of a liquid to its boiling point, and an outline of the mode of measurement of the tension of vapors. (See also Expansion, and Steam.)—The following table, from Miller's "Chemical Physics," gives some of the results of Regnault's experiments upon the tension of vapors of several liquids at equal temperatures. The tension is measured by the height of a column of mercury which each vapor will support at a given temperature, the degrees being given on both the centigrade and Fahrenheit scales.

TEMPERATURE, deg. C.	Sulphuric ether.	Bisulphide of carbon.	Chloroform.	Alcohol.	Oil of turpentine.	Water.	TEMPERATURE, deg. F.
−20	2·725	......	......	0·131	......	0·036	−4
−10	4·356	3·110	......	0·256	......	0·082	14
0	7·176	5·008	......	0·501	0·082	0·182	32
10	11·278	7·846	......	0·948	0·090	0·361	50
20	17·117	11·740	......	1·732	0·168	0·686	68
30	25·078	17·110	......	3·086	0·275	1·245	86
40	35·971	24·310	14·330	5·159	0·460	2·168	104
50	49·920	33·57	20·641	8·673	0·675	3·631	122
60	68·121	43·71	29·054	13·776	1·058	5·874	140
70	90·92	60·98	38·43	21·228	1·628	9·208	158
80	116·03	79·94	53·85	32·00	2·408	13·998	176
90	153·50	103·27	71·31	46·86	3·582	20·740	194
100	193·72	130·75	92·70	66·33	5·310	30·00	212
110	246·02	162·84	118·91	92·59	7·372	42·45	230
120	......	201·58	150·31	126·26	10·117	58·87	248
130	......	246·47	185·86	170·51	13·660	80·14	266
140	......	......	......	221·95	18·199	107·27	284
150	......	......	......	285·73	23·798	141·36	302
160	......	......	......	......	30·596	183·61	320
170	......	......	......	......	38·93	235·32	338
180	......	......	......	......	48·41	297·87	356
190	......	......	......	......	59·62	372·71	374
200	......	......	......	......	73·45	461·38	392

—The vaporization of liquids under greatly increased pressure, as when they are heated in confined spaces, also exhibits remarkable phenomena. Alcohol, when heated in a space a little more than twice its volume to 404·6° F., expands to twice its original volume and suddenly becomes converted into vapor. A glass tube one third filled with water becomes opaque when highly heated, and bursts after a few seconds. The opacity of the tube is due to the chemical action of the water. If the space occupied by the water is one fourth of that of the whole tube, the liquid will be converted into vapor at about 772° F. When chloride of ethyle is heated in a very thick sealed glass tube, the upper surface becomes indistinct at about 338°, and is replaced by an ill defined nebulous zone. As the temperature rises the zone increases in breadth, and becomes more transparent, until finally the tube appears as if empty. Ether becomes completely vaporized in a space three times its volume at about 375°. The passage of a liquid into vapor is attended with a remarkable disappearance of heat, which is converted into another form of energy by which the particles are kept asunder. In ordinary language, such heat is said to become latent. (See HEAT.)

VAR, a S. E. department of France, in Provence, bordering on Basses-Alpes, Alpes-Maritimes, Bouches-du-Rhône, and the Mediterranean; area, 2,349 sq. m.; pop. in 1872, 293,757. The Hyères islands lie off the coast, which is indented by numerous bays, including those of Fréjus, Hyères, and Toulon. The surface is generally mountainous and rugged, particularly in the north and northeast, where it is traversed by offshoots of the Alps, and the only extensive tracts of level ground lie along the coast. The principal rivers are the Verdon and Argens, and there are several extensive lagoons along the coast. Coal, iron, and lead are found, but only the first is worked. About one third of the surface is covered with forests. The soil is not naturally fertile. The manufactures and productions consist chiefly of wine, fruit, silk, paper, leather, coarse woollens, perfumes, and olive oil. The coast fisheries are valuable, particularly those of tunny and anchovies. The department is divided into the arrondissements of Draguignan, Toulon, and Brignoles. Capital, Draguignan.—The river Var, from which the department takes its name, flows through the arrondissement of Grasse in the department of Alpes-Maritimes, detached from that of Var in 1861. It rises in the Maritime Alps, was formerly in part the boundary between France and Italy, and falls into the Mediterranean 5 m. S. W. of Nice.

VARANGIANS. See NORTHMEN, vol. xii., 498.

VARGAS, Luis de, a Spanish painter, born in Seville in 1502, died there in 1568. He completed his studies in Rome, and spent many years in Italy, after which he greatly improved the school of Seville. His death was accelerated by the tortures which he endured in his ascetic frenzy. His portrait of the duchess of Alcalá was regarded as equal to the works of Raphael. Only vestiges remain of his large religious fresco and oil paintings, but several of his most celebrated works are still extant, the best known being his painting representing the human genealogy of Christ, in the cathedral of Seville, called *La generacion.*

VARICOSE VEINS, veins in a state of permanent and preternatural dilatation. The cause of the disease is to be looked for in some obstruction to the return of blood through the affected veins. In some cases the obstruction may be in the heart itself; old cases of heart disease, when the right side of the heart becomes involved, are apt to be attended with a varicose condition of the veins of the neck. The pressure of tumors, aneurisms, &c., upon a large venous trunk, causes a varicose condition of its superficial branches; the pressure of the enlarged uterus in pregnancy is a fertile source of varicose veins of the lower extremities; a varicose condition of the hæmorrhoidal veins constitutes piles, of those of the testicle varicocele. A varicose condition of the veins of the lower extremity, arising from certain occupations which demand the long continued maintenance of the upright posture, from repeated pregnancies, and sometimes from weakness of the coats of the veins themselves, is an exceedingly common complaint. In the natural condition, by the frequently recurring contraction and relaxation of the voluntary muscles, the veins of the lower extremities are alternately filled and emptied. Walking about, or any ordinary form of exercise, therefore facilitates the movement of the blood in the veins. But where a single set of muscles only are kept in constant and unvarying action, as in continued standing at a writing desk or a machine, the movement of the blood is obstructed instead of being aided by the muscular contraction, and it accordingly accumulates in the veins near the point of obstruction, especially in the lower extremities, where it has to mount upward against the force of gravity. The veins are thus unnaturally distended, and when their distention becomes so great that the edges of their opposite valves are drawn away from each other, the weight of the superincumbent column of blood is thrown upon that portion of the vein next below, and thus the affection extends, gradually involving successive portions of the venous system. The veins are sometimes unequally dilated, with knots and protuberances distributed along their course. They are lengthened as well as dilated, their course becoming more tortuous. Sometimes the coats of the vein are thicker, sometimes thinner than natural, or both states may be present in the same vein. They are apt to cause more or less œdema of the affected limb, with a feeling of weight and fulness; sometimes they give rise to or are accompanied by ulcerations which are difficult to heal; occasionally, from gradual thinning of their coats or from accident, they burst and give rise to copious hæmorrhage, which may prove fatal.—The annoyance and suffering attending varicose veins may be very much alleviated by the application of a firm roller, or better still, an elastic stocking, to the affected limb, thus affording equable support to the distended veins; an essential condition is also that the patient should avoid a continued standing posture, which has nearly always so much to do with the original production of the disease. Various operative proceedings have been tried with a view of obliterating the diseased veins and thus curing the disease. These are not always successful, nor are they unattended with danger. The best perhaps is that of M. Velpeau, which consists in passing a needle beneath the trunk of the affected vein, and applying a twisted suture around it; if sufficient inflammation ensue to cause the occlusion of the vein, the needle may be withdrawn in a few days; if not, it is permitted to ulcerate its way through.

VARINAS. See BARINAS.

VARIOLOID, a mild form of smallpox, sometimes occurring in persons previously vaccinated or inoculated, and the virus of which will produce smallpox in those not thus protected. (See SMALLPOX, and VACCINATION.)

VARNA, a seaport town of European Turkey, in Bulgaria, near the N. E. spurs of the Balkan mountains, on the W. coast of the Black sea, 160 m. N. N. W. of Constantinople; lat. 43° 12′ N., lon. 27° 56′ E.; pop. about 20,000, of whom one half are Christians. It occupies an elevated position on the N. W. side of a bay in the gulf of Varna, formed by two rocky promontories, and is defended by a stone wall, batteries, and outworks. It is the seat of a Greek bishop, and contains five churches and eight mosques. The bay is sheltered on the north and northeast from the dangerous winds of the Black sea. The entrances of steamers in 1873 were 255, and the clearances 404; aggregate tonnage, 343,402; the inward and outward sailing vessels comprised 803 small craft with an aggregate tonnage of 89,864. The imports, chiefly manufactured and colonial goods, salt, and coal, amounted to $2,250,000, and the exports, mainly wheat, maize, barley, wool, and tallow, to $2,700,000. The town is connected by rail with Rustchuk and Shumla.—Varna occupies the site of ancient Odessus, a Greek city said to have been founded by the Milesians, and which exercised authority over Tomi, Calatis, Mesembria, and Apollonia, situated on the same coast. Under the Romans it was a town of Lower Mœsia. In the 7th century it fell into the hands of the Bulgarians. Its strategic importance has from the earliest times made it a scene of war. Hunyady and King Ladislas of Poland and Hungary were overwhelmed, and the latter perished, in the battle fought here with Sultan Amurath II., Nov. 10, 1444. In 1610 the Dnieper Cossacks took the town and rescued several thousand Christians from Turkish bondage. Varna resisted the Russians in 1783, although the fortifications proved even at that time inefficient. They have been since greatly improved. In 1828 it surrendered to the Russians after a siege of three months. It was restored to Turkey in September, 1829. In August, 1854, while Varna was occupied as a base of operations against the Crimea by English, French, and Turkish troops, a conflagration destroyed almost half of the town.

VARNHAGEN VON ENSE, Karl August Ludwig Philipp, a German author, born in Düsseldorf, Feb. 21, 1785, died in Berlin, Oct. 10, 1858. He studied in Berlin and at various periods in Halle and Tübingen, and was for some time a private tutor. He joined the Austrian army in 1809, and was wounded and captured by the French at Wagram and exchanged at Vienna, after which (1810) he visited Paris, and next resided alternately at Prague, Vienna, and Berlin. In 1813 he joined the Prussian rising against the French. In 1814 he married in Berlin Rahel Levin (1771–1833), a Jewess of remarkable intellect who had become a Christian, and whose extraordinary social influence had a happy effect upon his career. After assisting Hardenberg, the Prussian minister, at the congress of Vienna, and accompanying the allies to Paris, he became Prussian minister at Carlsruhe. In 1819 he declined the mission to Washington, and henceforth chiefly resided in Berlin. He was early associated with Chamisso, Fouqué, and others in periodical and other publications, and began to publish stories and poems in 1815–'16. In 1822 appeared his *Geistliche Sprüche des Angelus Silesius*, with an introduction, which was reproduced in 1849 with selections from Saint-Martin and with annotations by his wife; and in 1823 his *Goethe in den Zeugnissen der Mitlebenden.* He is best known as a writer of biographies; his first series was *Biographische Denkmale* (5 vols., 1824–'30; 3d ed., 1872). After the death of his wife he published *Rahel, ein Buch des Andenkens für ihre Freunde* (3 vols., 1834), and *Galerie von Bildnissen aus Rahels Umgang* (2 vols., 1836); and his correspondence with her has appeared in a complete edition entitled *Briefwechsel zwischen Varnhagen und Rahel* (6 vols., Leipsic, 1875). His niece Ludmilla Assing has published several volumes of his posthumous works, and Alexander von Humboldt's letters to him. (See ASSING.) Among the many interesting posthumous publications of Varnhagen are his *Tagebücher* (14 vols., Leipsic, 1861–'72), *Blätter aus der preussischen Geschichte* (1868–'9), and *Biographische Porträts* (1871). The third enlarged edition of his select works comprises three parts: the first (6 vols., 1875) entitled *Denkwürdigkeiten des eigenen Lebens*, the second (10 vols., 1875) *Biographische Denkmale*, and the third (in process of completion, 1876) *Vermischte Schriften.*

VARNISH, a solution of resinous matter, used for covering the surfaces of bodies to give them a shining appearance, and to protect them against the air and moisture. The principal substances which enter into the composition of varnishes are: as solid constituents, rosin, amber, mastic, sandarach, lac, elemi, dammar, benzoin, copal, asphalt, and caoutchouc; as solvents, oil of turpentine, linseed, poppy, and a few other vegetable oils, wood naphtha, benzine, and some other constituents of petroleum, alcohol, and ether. As coloring materials, gamboge, dragon's blood, aloes, saffron, annatto, and turmeric are used; to which may be added small quantities of cochineal, French yellow, and other colors, to impart increased brilliancy. Varnishes may be divided into four classes: 1, ether varnishes; 2, spirit varnishes; 3, volatile-oil varnishes; and 4, fixed-oil varnishes. Of the first kind the only one much used is that for repairing the glazing of the colored enamels used in jewelry. It is made by gradually adding five parts of pulverized copal to two parts of sulphuric ether, in a flask which is corked and occasionally shaken for 24 hours or longer. Spirit varnishes made with alcohol are conveniently prepared, and, on account of their rapid drying and leaving no disagreeable smell, are in frequent use in the household for covering various articles of art or *vertu* made by amateurs. When large quantities of spirit varnish are made, a still, with a capital and worm, is usually employed. A stirring rod passes through a stuffing box in the capital. The still is heated by a steam or water bath. The materials being placed in the still, the heat is raised until the alcohol begins to distil. The heat is then lowered, and the solution continued with stirring in an equable manner with as little evaporation as possible. When the stirring rod by its easy turning gives evidence of complete solution, the varnish is passed through a silk sieve and then through porous paper, or allowed to clarify in stone jars. The alcohol which may have distilled over should be added to the varnish. Spirit varnishes are liable to scale off or crack, and are incapable of resisting friction or blows. To diminish this tendency, small quantities of oil of turpentine are often added to them, or some of the softer and more adhesive resins are employed in their composition. The alcohol should not be of less strength than 40° to 36° Baumé (sp. gr. 0·830 to 0·849), as otherwise the resins dissolve with much more difficulty, and the varnish will neither be so brilliant nor so drying. Three ways of making the solution are employed, viz.: 1, by simply digesting the resins, &c., in the proper quantity of alcohol, either in the shade or exposed to the sun, occasionally shaking the bottle; this takes a long time, and many substances cannot be dissolved in this way, but the product has the least possible amount of color; 2, by heating over a water bath, which is much more rapid, but produces more highly colored varnishes; 3, by heating over an open fire, which still more changes the color of the resins, and consequently of the varnish, but it is so much more rapid that it is employed almost exclusively for manufacturing purposes.—Oil of turpentine is almost the only volatile oil employed in varnishes, and the most important one into which it enters is copal varnish. (See COPAL.) The ingredients and modes of preparation are nearly the same as for spirit varnishes. An important difference between the two kinds is, that spirit varnishes are injured in quality by keeping, while those with oil of turpentine are very much improved by it, from the more intimate union which takes place between the resins and the oil.—Fixed-oil varnishes are almost entirely made with linseed oil, for which poppy oil is sometimes substituted, and they generally contain also a large proportion of oil of turpentine. The resins used are almost exclusively the different kinds of copal, and amber. In consequence of the slow evaporation of the solvent, and the large amount of residue from it, they are, of all varnishes, the slowest in drying, but the most durable. (See LINSEED OIL.) For articles of sheet iron, tin, copper, or brass, and for all articles exposed to constant wear and frequent rubbing, they are particularly adapted. (See JAPANNING.) In consequence of the difficult fusibility of the copal, a very different process from that used for spirit and turpentine varnishes must be employed in their preparation. The resin is first melted over an open fire; and when perfectly liquid, the linseed oil, heated to 300° or 400° F., is incorporated with it, and finally the oil of turpentine. It is indeed possible to melt copal directly in boiling oil, and the subsequent addition of a proper quantity of oil of turpentine will bring it to a proper consistence; but as in this case the oil is always more or less burnt, the varnish is both more highly colored and less drying, and this method has been generally abandoned. Great care should be taken that the resins used are of equal fusibility, for if the heat is much raised or long continued after complete fusion of a part, there will be much more color than even if the more infusible parts alone were used. —Besides the four classes of varnishes above described, others are employed for special purposes which can scarcely be included under any of them. Dr. Bolley describes a caoutchouc varnish, which appears to possess valuable properties. The caoutchouc is cut into small pieces and digested in sulphuret of carbon, which forms a jelly with it; and by treating this with benzole, a large proportion will be dissolved. The liquid must be strained through a woollen cloth, and the sulphuret of carbon removed by evaporation in a water bath, after which the liquid may be diluted with an additional quantity of benzole. A gutta percha varnish is made by dissolving one part of gutta percha in 4 or 6 parts of oil of turpentine, and adding 8 or 10 parts of linseed-oil varnish, boiling hot. It is well adapted for varnishing maps and prints, as it does not affect the whiteness of the paper, does not reflect light disagreeably as resinous varnishes do, and is not liable to scale off. Another valuable varnish, called "milk of wax," is prepared by melting a certain quantity of white wax, adding to it while in fusion an equal quantity of alcohol, of specific gravity 0·83, stirring the mixture, and pouring it out upon a porphyry slab, on which it is ground with a muller until it becomes smooth and homogeneous, when water is mixed in by degrees to the amount of four times the weight of the wax, and the emulsion finally strained through canvas. This may be spread with a smooth brush on the surface of a painting, allowed to dry, then fused by passing a hot iron over it, and when cold rubbed with a linen cloth to bring out the lustre. To some such process as this the ancient paintings on the walls of Herculaneum and Pompeii owe their freshness at the present day. Prof. Böttger proposes the following black varnish for zinc: Dissolve 2 parts of nitrate of copper and 3 parts of chloride of copper in 64 parts of water, and add 8 parts of nitric acid. Puscher's method is as follows: He dissolves equal parts of chlorate of potash and sulphate of copper in 36 times as much warm water, and leaves the solution to cool. The zinc castings are immersed for a few seconds in the solution, or the sheets may be washed with a sponge, which turns them quite black with oxide of copper. They are then washed and dried, and the coating is rubbed with a cloth, which imparts a glittering indigo appearance. Milk of wax varnish may then be applied, which gives the surface a deep black color and gloss.—The following comprise some of the best recipes for varnishes:

INGREDIENTS.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Shell lac, lbs.	..	..	..	..	..	2	2	..	..	..	..	1½	1	½
Mastic, "	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Sandarach, lbs.	..	..	..	..	2	4	..	..	..	..	..	..	..	..
Dammar, "	..	..	..	..	..	..	..	..	..	..	4	..	..	..
Rosin, "	..	..	..	..	..	..	..	4	..	..	..	..	..	..
Amber, "	..	..	..	..	..	..	..	..	..	6	..	..	..	..
Benzoin, "	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Copal, "	8	7	8	8	..	..	..	..	..	..	..	..	..	..
Spirits of wine, galls.	..	..	..	..	1	5	1	..	..	..	..	1	1	..
Oil of turpentine, "	3	3	3½	5½	..	..	..	1	1	4	1	..	..	1
Linseed oil, "	2	½	2	2½	..	..	..	..	..	2	..	..	..	..
Turpentine, lbs.	..	..	..	..	..	2	..	..	..	..	..	..	..	..
Turpentine varnish, pint	..	..	..	..	..	..	1	..	..	..	..	..	[illegible]	..
Venice turpentine, oz.	..	..	..	..	18	..	18	..	..	..	..	..	..	..
Canada balsam, gall.	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Powdered glass, lbs.	..	..	..	..	..	4	..	..	..	..	..	..	..	..
Black sealing wax, lbs	..	..	..	..	..	..	..	..	..	..	..	..	3	..
Red sealing wax, lbs.	..	..	..	..	..	..	..	..	..	..	..	2½	..	..
Asphalt, lbs.	..	..	..	..	..	..	..	..	..	..	..	..	..	3

No. 1 is copal varnish for fine paintings; 2, cabinet varnish; 3, best body copal varnish, for bodies of coaches, &c., which require polishing; 4, carriage varnish for parts not requiring to be polished; 5, best white hard spirit varnish; 6, white spirit varnish for violins; 7, brown hard spirit varnish; 8, turpentine varnish; 9, crystal varnish; 10, amber varnish; 11, paper varnish; 12, sealing wax varnish; 13 and 14, black varnishes.—Besides all these compound varnishes, the liquid resins which exude from many species of trees, especially in China, Japan, Burmah, and India, are used as varnishes, either crude or with slight preparation. (See JAPANNING.) The Chinese varnish is said to be produced by the *augia Sinensis*, and is black when simply dried, but is colored by various pigments. The Japan varnish of Kämpfer and Thunberg is *rhus vernix*, and that of the Malayan islands *stagmaria verniciflua*. The juice of *holigarna longifolia* is used in Malabar for varnishing shields; the Burmese varnish tree is *melanorrhœa*, and a fine liquid varnish is yielded by *vateria Indica* and *V. lanceæfolia*. A resinous juice is also employed by the Feejeeans as a varnish or glaze for their pottery.

VAROLI, Costanzo, an Italian anatomist, born in Bologna about 1543, died in Rome in 1575. He studied medicine at Bologna, and acquired considerable distinction as a teacher of anatomy there, but removed to Rome on being appointed physician to Pope Gregory XIII. He was especially distinguished for his dissections of the brain, which he was the first to examine from the base upward, instead of from above downward, as had previously been the custom. He first fully described the arched bundle of nervous matter passing from side to side across the central parts of the base of the brain, and now known, from its resemblance in form to a bridge, as the *pons Varolii.* His principal works are *De Nervis Opticis, nonnullisque aliis, præter communem opinionem in Humano Capite observatis* (Padua, 1573), and *De Resolutione Corporis Humani*, published after his death (Frankfort, 1591).

VARRO, Marcus Terentius, a Roman scholar, born in the Sabine town of Reate in 116 B. C., died in 28. He received a liberal education, held a high office in the navy in the wars against the pirates and against Mithridates, and at the commencement of the civil war was serving in Spain as legate of Pompey. When Cæsar marched into that country after the reduction of Italy, Varro was obliged to surrender his forces; but still adhering to the aristocratic party, he joined Pompey in Greece and remained faithful to him until the victory of Pharsalia (48) had made Cæsar master of the Roman world. Varro's villa at Casinum was taken and plundered by Antony, but Cæsar treated him kindly, and employed him to superintend the collection and arrangement of the works in the library at Rome designed for the public use. From this time Varro lived in retirement. During the second triumvirate he was put by Antony on the list of the proscribed, but by the aid of friends his life was saved, though his libraries were destroyed. Augustus appointed him superintendent of the library founded by Asinius Pollio. According to a list traceable to himself, Varro wrote 74 works in 500 or 600 books, including several in metrical form, and prose treatises on nearly all branches of knowledge and literature. All these have perished except the *Rerum Rusticarum Libri III.*, the only one that has been preserved entire, and *De Lingua Latina*, of the original 24 books of which only books v. to x. remain in a mutilated state. The former is a dialogue after the manner of Cicero's philosophical writings, but far more graphic, and replete with puns on the names of his characters. The best edition is in the *Scriptores Rei Rusticæ Veteres Latini* of J. G. Schneider (4 vols. 8vo, Leipsic, 1794–'7). It has been translated into English by the Rev. T. Owen (Oxford, 1800). The linguistic value of Varro's grammatical fragment is very unequal, and the style is uncouth and awkward. The first edition is by Pomponius Lætus (Rome, 1471); recent editions are by Müller (Leipsic, 1833) and Egger (Paris, 1837). Varro was sometimes called Reatinus from his estate at Reate.

VARRO, Publius Terentius, a Latin author, surnamed Atacinus, from the Atax (now Aude), a river of Gallia Narbonensis, where he was born, according to Jerome, in 82 B. C., died in 37. At first he wrote satires and epic and elegiac poems, but he became more famous as a translator of Greek poems, as the *Argonautæ*, *Chorographia*, and *Ephemeris*. Only fragments of his works are extant.

VARUS, Publius Quintilius. See ARMINIUS.

VAS (Ger. *Eisenburg*), a county of Hungary, in the Trans-Danubian circle, bordering on Lower Austria, Styria, and the counties of Oedenburg, Veszprém, and Zala; area, 1,944 sq. m.; pop. in 1870, 331,602, chiefly Magyars and Germans, and about three fourths Catholics. It is traversed in the west and south by spurs of the Alps. The principal river is the Raab. The chief products are grain, wine, and fruit. Vas is called after the village of Vasvár, once a free town and a strong fortress under Matthias Corvinus. The capital is Szombathely (anc. *Sabaria;* Ger. *Steinamanger*); another important town is Güns.

VASA. I. A W. län or government of Finland, Russia, bordering on the gulf of Bothnia; area, 16,146 sq. m.; pop. in 1872, 310,937. The surface is level, and there are fewer lakes than in any other part of Finland. **II.** A town, capital of the län, on a small bay of the Baltic, 230 m. N. W. of Helsingfors; pop. in 1867, 4,551. Its port has become greatly obstructed by sand.

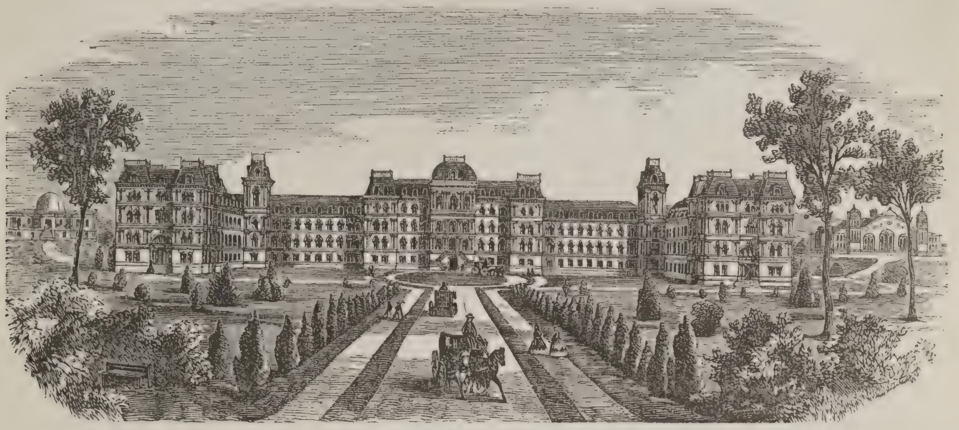
VASA, Gustavus. See GUSTAVUS I.

VÁSÁRHELY, also called Hód-Mezö-Vásárhely, a town of S. Hungary, in the county of Csongrád, near the E. bank of the Theiss, 14 m. N. E. of Szegedin, with which it is connected by rail; pop. in 1870, 49,153, mostly Protestants. It has a Protestant gymnasium and well attended fairs. The inhabitants are nearly all agriculturists of Magyar or Slavic race. (For Vásárhely in Transylvania see MAROS-VÁSÁRHELY.)

VASARI, Giorgio, an Italian artist, born in Arezzo in 1512, died in Florence, June 27, 1574. He belonged to a family of painters, was brought up at Florence by his kinsman Cardinal Passerini, together with Ippolito and Alessandro de' Medici, and became the friend and pupil of Michel Angelo and Andrea del Sarto. After returning to Arezzo in 1527 he produced his first religious painting. Subsequently he was also engaged as a sculptor in that city and in Rome, where he acquired a fortune. His chief works are a "Descent from the Cross" in Rome; the design for the villa Giulia, finally executed by Michel Angelo and Vignola; decorations for the Medici palace at Florence, including the "Adoration of the Magi;" and "Martyrdom of St. John the Baptist" at Rome, one of his masterpieces. He was one of the founders of the Florentine academy of fine arts. His biographical work on Italian artists is still a standard authority. It is entitled *Le vite de' più eccellenti pittori, scultori e architetti* (in 3 parts, Florence, 1550; 2d ed. enlarged, 2 vols. 4to, 1568; best recent ed., 13 vols. 12mo, Florence, 1846–'57). It has been translated into English by Mrs. Jonathan Forster (5 vols., London, 1850–'52).

VASCO DA GAMA. See GAMA.

VASSAR COLLEGE, an institution of learning near Poughkeepsie, N. Y., founded by Matthew Vassar for the advanced education of young women. The founder was born in Norfolk county, England, April 29, 1792, and in 1796 came to the United States with his father, who settled on a farm near Poughkeepsie. The father engaged in brewing, in which his son subsequently accumulated a large fortune. In February, 1861, Mr. Vassar delivered to trustees, incorporated for the purpose by the legislature in the preceding January, $408,000 for the founding of Vassar female college, accompanying the gift with a statement of his wishes concerning the plan of the college and its system of instruction. About half of this sum was to be expended in the erection of buildings, for which he gave a beautiful site of 200 acres nearly two miles E. of Poughkeepsie and a little greater distance from the Hudson river, and the remainder to form an endowment for the partial support of the professorships, &c. It was not his purpose to make it a charity school, but to afford to women opportunities for obtaining a collegiate education at moderate cost, and gratuitous instruction to those unable to pay for it. All sectarian influences were to "be carefully excluded, but the training of our students should never be intrusted to the skeptical, the irreligious, or the immoral." Mr. Vassar died June 23, 1868, and left a bequest of $50,000 to constitute a lecture fund, the income to be used in maintaining, without extra charge to the students, lectures on literature, science, and art; $50,000 as a library, art, and cabinet fund; and $50,000 as an "auxiliary fund for aiding students of superior promise and high scholarship, who are unable to pay the full charges for board and tuition in the college." The construction of the main college building was completed in 1865. It is of brick with blue freestone trimmings, 500 ft. in length, with a breadth at the centre of 200 ft., and at the transverse wings of 164 ft. The central building and the wings are five stories high, and the connecting parts four stories. Within the edifice are five independent dwellings for resident officers, accommodations for about 400 students, recitation and lecture rooms, a chapel, and apartments for a library and reading room, philosophical apparatus, laboratories, &c. Apart from the main edifice are an observatory and a spacious museum, containing an art gallery, a studio, cabinets of natural history, a lecture room, music rooms, a hall for literary societies, a hall for calisthenics, and a bowling alley. In 1861 Prof. Milo P. Jewett was chosen president of the institution, and he subsequently visited Europe to obtain information for the promotion of its organization. In 1864 he resigned, and was succeeded by John H. Raymond, LL. D., who still holds the office (1876). In September, 1865, the college was opened with 8 professors and 20 other instructors, besides the president and lady principal, and 300 students, which number was increased during the year to 350. In 1867 the name of the institution was changed from Vassar female college to its present form. There is a preparatory course of study of about two years, and a collegiate course of four years. Special collegiate courses are also provided for advanced students not under 20 years of age. Applicants for admission to the preparatory classes must be at least 15 years of age, and to any college class at least 16. In all cases admission must be preceded by examination. To the middle of the sophomore year all studies are prescribed, except that the student has the option of taking Greek, German, or French. For the remainder of the course the student must pursue at least three studies, which may be selected by herself subject to the approval of the faculty. Students are encouraged to take, in addition to the regular course, one study in drawing, painting, and modelling, or in music. Students who complete the regular course receive the first or baccalaureate degree. A candidate for the second degree must pass examination in studies which have been approved by the faculty as equivalent to a post-graduate course of two years, and must present a satisfactory dissertation on some literary or scientific subject. The price of board and tuition for each student is $400 for the college year of 40 weeks. An extra charge is made for private lessons in music and the arts of design. Provision is made by the auxiliary fund for remitting to indigent students one half the charge for board and tuition. In 1875–'6 there were, besides the president and lady principal, 9 professors, of whom 3 were women, 22 female teachers, and 370 students, of whom 202 were pursuing collegiate and 168 preparatory studies. Of the students, 114 were from New York, 253 from other states, 2 from Canada, and 1 from Russia. The total number of graduates of the college to the close of 1875–'6 was 323. The college has a library of 9,000 volumes, and valuable philosophical apparatus.



Vassar College.

VATER, Johann Severin, a German linguist, born in Altenburg, May 27, 1771, died in Halle, March 16, 1826. He was a student and professor at Jena and Halle, in 1809 was transferred to Königsberg, and in 1820 resumed his chair at Halle. Although he taught theology, he is chiefly known as a philologist. His works include a Hebrew grammar (1797); *Handbuch der hebräischen, syrischen, chaldäischen und arabischen Grammatik* (1801); a Polish (1807) and a Russian grammar (1809); a continuation of Adelung's *Mithridates* (1809–'17); and *Literatur der Grammatiken, Lexika und Wörtersammlungen aller Sprachen der Erde* (1815). He also edited and continued Henke's *Allgemeine Geschichte der christlichen Kirche* (1818–'23).

VATICAN, the papal palace at Rome, so called from its situation on the Mons Vaticanus, at the extreme N. W. part of the city. It adjoins the basilica of St. Peter, and is a little less than half a mile from the castle of Sant' Angelo, with which it communicates by a covered gallery built by Pope John XXIII. early in the 15th century. The palace, one of the most magnificent in the world, has grown up by degrees, and consequently exhibits a great want of architectural harmony. There was a palace attached to St. Peter's certainly in the time of Charlemagne, and probably before the reign of Constantine. It was rebuilt by Innocent III. (1198–1216), and enlarged by Nicholas III. (1277–'81), but did not become the permanent residence of the popes until after their return from Avignon in 1377. Very little of the present edifice is older than the time of Nicholas V. (1447). The renovation of the old palace, which he commenced, was completed by Alexander VI. (1492–1503), after whom that part of the building is now called the *appartamento Borgia.* The Sistine chapel was added by Sixtus IV. in 1474, and the Pauline chapel by Paul III. in 1534. Innocent VIII. (1484–'92) constructed the Belvedere villa a short distance from the palace, and Julius II. (1503–'13) connected it with the Vatican by means of the celebrated *loggie* and a terraced court. To Julius II. is also due the foundation of the museum. Pius VII. constructed the *braccio nuovo* for sculptures; Gregory XVI. added the Etruscan museum; and Pius IX. has added a fourth side to the cortile di San Damaso. The portion of the Vatican which is now the ordinary residence of the popes lies on the E. of the *loggie*, and was built chiefly by Sixtus V. (1585–'90) and Clement VIII. (1592–1605).—The whole palace, which is rather a collection of separate buildings than one regular edifice, occupies a space of 1,151 by 767 ft., and has 200 staircases, 20 courts, and 4,422 rooms. The *scala regia*, or great staircase, is a masterpiece of Bernini, and chiefly remarkable for its perspective. It leads to the *sala regia*, built by Antonio di Sangallo as an audience hall for the reception of ambassadors, and decorated with frescoes by Vasari, Marco da Siena, Taddeo and Federigo Zucchero, Giuseppe Porta, and others. The Sistine and Pauline chapels open into this hall. The former contains, besides the magnificent frescoes of the ceiling, Michel Angelo's first masterpiece in painting, his "Last Judgment," together with frescoes by Perugino, Ghirlandaio, and others, representing passages in the lives of Christ and Moses; the latter possesses Michel Angelo's frescoes of the "Conversion of St. Paul" and "Crucifixion of St. Peter." The chapel of San Lorenzo has a series of remarkable frescoes by Fra Angelico. The *stanze* of Raphael is the name given to four chambers decorated by the hand of that great master; the paintings in one represent events in the lives of Leo III. and Leo IV.; in another are illustrations of the sciences of theology, philosophy, poetry, and jurisprudence; in the third, the triumphs and miracles of the church; and in the fourth, the sovereignty of the church. The frescoes on the roof of the first are by Perugino, and the last contains only two figures by Raphael, the rest having been completed after his death by Giulio Romano and others. The *loggie*, already referred to, form a triple colonnade around three sides of the court of San Damaso, the uppermost story supported by columns, and the two lower by pilasters. They were built after designs by Bramante, and on one side of the court were painted from the designs of Raphael; they have been much injured by exposure to the weather and other causes, but are now protected by glazed sashes. The museum is one of the most magnificent collections of the kind ever made. Among its principal features are the gallery of inscriptions, containing over 3,000 specimens of ancient sepulchral inscriptions and monuments; the *museo Chiaramonte*, devoted to ancient sculptures, with the *braccio nuovo*, a fine hall added to it in 1817, and containing a semicolossal statue of an athlete, supposed to be the famous *Αποξυόμενος* of Lysippus; the *museo Pio-Clementino*, devoted to works of the same class accumulated by Julius II., Leo X., Clement VII., Paul III., and especially Clement XIV. and Pius VI., and possessing the Torso Belvedere and the sarcophagus of Scipio; the *cortile di Belvedere*, containing bass-reliefs, statues, sarcophagi, baths, &c., among which are the Laocoön and the Apollo Belvedere; the halls of the animals, of the busts, and of the Muses, so named from the character of their principal statues; the gallery of statues, in which are the Apollo Sauroctonos and the supposed Cupid of Praxiteles; the cabinet of the masks; the hall of the Greek cross, with the sarcophagi of Sts. Helena and Constantia, the mother and daughter of Constantine; the gallery of the candelabras, the *sala degli Arazzi*, so called from the "tapestries of Raphael" manufactured at Arras in 1515–'16; and the hall of the *biga*, so called from an antique two-wheeled chariot in white marble. The Etruscan museum contains 12 chambers, filled with relics of the ancient inhabitants of Italy. The Egyptian museum, commenced by Pius VII., is inferior to many similar collections in other parts of Europe. The picture gallery contains greater treasures than any other in the world, though the whole catalogue barely numbers 50 paintings. Among these are Raphael's "Transfiguration," "Madonna di Foligno," and "Coronation of the Virgin;" Domenichino's "Communion of St. Jerome;" and works by Titian, Andrea Sacchi, N. Poussin, Guido, Caravaggio, Baroccio, Perugino, Guercino, Fra Angelico da Fiesole, Pinturicchio, Correggio, Melozzo da Forli, Andrea Mantegna, and Paul Veronese.—The library was founded in 1378, and now contains 105,000 volumes and 25,500 manuscripts, in a building erected by Sixtus V. in 1588. The manuscript collection, though not the largest, is the most valuable in the world.

VATICAN, Council of the, the 20th œcumenical council according to the Roman Catholic church, convened Dec. 8, 1869. The design of calling a general council was first intimated in a consistorial address of Pius IX., delivered June 26, 1867, to the prelates assembled in Rome to celebrate the 18th centenary of the martyrdom of St. Peter and St. Paul. The prelates, in a joint answer presented to the pope on July 1, expressed the wish that he would soon execute his design. On June 6 a circular had been prepared by Cardinal Caterini, prefect of "the congregation of the council (of Trent)," containing a schedule of 17 important points of church discipline and morality on which, as well as on others suggested to the bishops from personal observation, an examination was requested with an answer within four months. The points submitted regarded principally the sacredness of Christian matrimony; the tone required in preaching, and the care to base all pulpit instruction on revealed truth; the importance of securing Christian influences in schools; the necessity of a more elevated preparatory training in ecclesiastical seminaries, and the means of encouraging higher culture in sacred and profane knowledge among the priesthood; the policy of encouraging the multiplication of religious associations bound only by simple vows; how to provide worthy incumbents for vacant episcopal and parochial offices, and how to regulate the exercise of episcopal authority over the inferior clergy. Most bishops communicated this document to their priests; and thus the whole Catholic world was already preparing for the approaching council when the bull of indiction, *Æterni Patris*, was issued, June 29, 1868, appointing the council to open in the Vatican basilica, Dec. 8, 1869. For the first time in the history of general councils, no invitation was extended to any of the European governments; only the bull of convocation expressed the hope that the various governments would leave the bishops free to attend. The Russian bishops alone were not allowed this freedom. On Sept. 8, 1868, the pope addressed a letter of invitation to the bishops of all the oriental churches not in communion with Rome; and on Sept. 13 he issued the letters apostolic, *Jam vos omnes noveritis*, to "all Protestants and non-Catholics," exhorting them "to consider whether they were walking in the way commanded by Christ and leading to eternal salvation." The Greek Orthodox church returned no answer, though a few of its bishops manifested a desire to accept the pope's invitation. The Armenian patriarch, Boghos, accepted, and induced several of his associates to do so; but he was forced to resign his office in consequence. In the Protestant world, the grounds on which the pope based his appeal were denounced as an unwarranted assumption of right. In Germany Reinhold Baumstark of Constance and Wolfgang Menzel of Stuttgart, editor of the *Literaturblatt*, were among the few who spoke favorably of the invitation to Protestants. In England Dr. Cumming, in the name of the church of Scotland, inquired whether Protestants would be permitted to present to the council arguments in support of their position toward the church of Rome, and the pope replied, on Sept. 4 and Oct. 30, that while no discussion could be permitted of doctrinal questions already defined, he was sincerely desirous of meeting all who believe that their separation is based on solid reasons, by referring them for consultation to the most eminent and prudent theologians selected by himself. No special appeal having been made to the Jewish people, two converts of that race, the brothers Joseph and Auguste Lémann of Lyons, published *La question du Messie et le concile du Vatican*, which the pope praised in a brief; a further petition, presented by the authors to the council itself, requesting that the Jews should be specially invited, produced no response.—A congregation of cardinals, assisted by theologians representing the principal Catholic countries, was appointed immediately after the publication of the bull of indiction, to take in hand the general work of preparation. To this were adjoined six commissions, on ceremonies, on ecclesiastical policy, on oriental churches and missions, on religious orders, on dogmatic theology, and on church discipline, respectively, each presided over by one of the seven cardinals. Up to the opening of the council no place was given to the doctrine of pontifical infallibility on the *schemata* or programmes submitted to the congregations and commissions; but from the first indiction of the council, the religious as well as the political press began to discuss the opportuneness as well as the danger of making this doctrine an article of faith. In France, Belgium, Holland, and Germany (where many of the bishops and inferior clergy had been taught the Gallican views of papal prerogatives, and where the majority of statesmen and lawyers upheld extreme Gallican principles concerning the superiority of a general council to the pope, the absolute independence of the state of all spiritual authority, and the right of national churches to regulate their own temporal affairs) all the controversies of the middle of the 17th century were revived. The Jansenists, who were numerous in Holland, and influential though few in France and Germany, were foremost in their attacks on the ultramontanes. Napoleon III. was personally in favor of holding the council, and not opposed to a definition of the received doctrine on infallibility; but the leading members of the French government were known to be hostile to both projects. The Austrian government thought the revival of this controversy untimely and perilous; while at Munich the prime minister, Prince Hohenlohe, and his associates followed the impulse given them by Döllinger; and a circular, now known to be the work of the latter, was addressed by Bavaria, April 9, 1869, to the Roman Catholic courts, calling their attention to the projects entertained by the promoters of the council. "The only dogmatic thesis," the circular affirmed, "which Rome wishes to have decided by the council, and which the Jesuits are now agitating throughout Italy and Germany, is the question of pontifical infallibility. This pretension, once become a dogma, will evidently have a wider scope than the purely spiritual sphere, and will become eminently a political question; for it will raise the power of the sovereign pontiff, even in temporal matters, above all the princes and peoples of Christendom." In June a second circular from Prince Hohenlohe invited the governments to unite in preventing the meeting of the council. This was seconded by the Italian prime minister, Menabrea; and a joint note from Italy and Bavaria urged Napoleon III. to withdraw his troops from Rome during the sitting of the council. The Bavarian ministry addressed a series of questions to the theological faculty of the university, regarding the embarrassments likely to ensue between church and state if the teaching of the syllabus were made a doctrine of faith. These questions were discussed throughout Germany. The answer of the faculty, though guarded on the main doctrinal points, was unfavorable to the infallibilist view, and arraigned the Jesuits for revolutionizing the public and private teaching of the church. The publication of this answer increased the opposition to the council, and Bavaria sent to the courts of southern Germany a circular urging them to address a similar series of questions to their respective universities. Simultaneously with this an address embodying the most formidable objections to the ultramontane doctrines in general, and in particular against the syllabus, as well as the opportuneness of any new dogmatic definitions, was printed in the principal European languages, and sent to all the members of the Roman Catholic hierarchy. This was the work of a committee of laymen, who had their centre of action at Coblentz. Another document, known as the "Coblentz Address," was at the same time published in that city, purporting to be a lay remonstrance to the archbishop of Treves on the proposed action of the council, and submitting a large plan of church reform, the chief points of which were afterward embraced in the changes advocated by the Old Catholics. They demanded that the coming council should decree the separation of the church from the state, the government of parishes by local boards, that of dioceses by diocesan synods, that of national churches by national councils, the nomination of bishops by the people, the suppression of the *Index Expurgatorius*, &c. An identical address signed principally by laymen, which obtained the assent and support of the faculties of the leading German universities, was presented to other bishops. Count Montalembert from his deathbed adhered by letter to the Coblentz address. The Vienna *Neue freie Presse* of June 16 denounced the agitation as a conspiracy having its centre in Munich, and Dr. Döllinger for its promoter. In France the periodical *Correspondant* advocated the views of the German opposition, but was combated by Louis Veuillot in the *Univers*, by Laurentie in the *Union*, by the *Tijd* of Amsterdam, and by the *Catholique* of Brussels. As the time for the meeting of the council approached and the discussions of the public journals increased in vehemence, MM. Baroche, Rouher, Daru, and others, by their speeches in the senate and their published correspondence, reëchoed the fears expressed by the statesmen, journalists, and theologians of Germany. The series of letters on papal prerogatives that appeared in the Augsburg *Allgemeine Zeitung* in March, reappeared in a more elaborate form at Leipsic in the anonymous book *Der Papst und das Concil*, by "Janus," and this was supplemented by *Die Reform der römischen Kirche in Haupt und Gliedern*. The bishops of Germany met at Fulda in September, and signed a joint pastoral letter, in which they pronounced groundless the fears about the supposed dangers to the constitution of the church, to her legitimate relations with the civil power, to the happiness and liberty of peoples, and to the just rights of science and civilization. They repelled the motive attributed to Pius IX. of wishing to make himself an absolute monarch, the infallible arbiter of doctrines as well as of temporal interests, and of laboring to be the head of a controlling and tyrannical party in the church. Bishop Maret, dean of the theological faculty of the Sorbonne, published in September *Du concile général et de la paix religieuse* (2 vols.), which was dedicated to the pope, but advocated the purest Gallicanism, and was heralded by the praise of the liberal press, and by a violent controversy between the bishop and the *Univers*, the leading ultramontane journal. This work was either repudiated or condemned by all but three or four of the French bishops. Between Bishop Dupanloup of Orleans, on the one hand, and Archbishops (afterward Cardinals) Dechamp of Mechlin and Manning of Westminster, a public correspondence took place just as the prelates of all countries were taking their departure for Rome. In November Archbishop Darboy of Paris, who had publicly taught as professor the doctrine of papal infallibility, but was opposed to the opportuneness of a conciliary definition, reproduced the main points of the circular issued from Fulda, in a pastoral letter, which produced a deep impression.—On Nov. 27, 1869, the pope published the official letter, *Multiplices inter*, establishing the order to be followed in the celebration and deliberations of the council. In this he repeats the chief reasons for holding it: the extirpation of error, providing a remedy for the ills of the church, the reform of morals, and the restoration of discipline. Three other points are deserving of notice: the right and manner of proposing any matter to the council, the manner of proceeding in general congregation or committee of the whole, and the ceremonial of the solemn or public sessions to be held in presence of the pope himself. As to the first, every bishop has a right to make a proposition to the council; but this must be in accordance with the common teaching of the church, and be previously submitted to the special committee or congregation charged with examining such propositions. If approved by the committee, it is referred to the pope, who decides on the opportuneness of bringing it before the council. As to the second, it is decreed that the doctrinal or disciplinary *schemata* or resolutions drawn up during the 18 previous months by the preparatory commissions shall be distributed among the members of the council in good time before the general congregations; that four deputations or special committees shall be established by the council, on faith, church discipline, religious orders, and oriental rites, each to consist of 24 members elected by ballot in the council; that in every general congregation, after discussing the matters prepared and submitted, a vote shall be taken thereon, and decrees adopted to be promulgated afterward in public session; in these, after the reading of the decrees thus prepared, the votes of all the members present shall be taken and counted before the pontifical throne, in presence of the pope, who will then sanction them. On Dec. 2 a prosynodal or preparatory assembly of all the prelates present in Rome was held, the pope presiding. On the evening of the 7th Pius IX. with a numerous cortége went to the church of the Apostles to inaugurate nine days of public prayer for the divine light on the approaching deliberations. With the first break of day on the 8th, the artillery of the castle of Sant' Angelo and the bells of all the churches in Rome pealed forth. By 6 o'clock the naves of St. Peter were filled, as well as the piazza and the streets leading to it. At 9 the head of the procession began to appear on the square; and more than an hour elapsed before it could reach the left arm of the transept, which had been partitioned off and furnished as the council hall. Mass was celebrated by Cardinal Patrizzi, vice dean of the sacred college, and Bishop Fessler of St. Pölten in Austria, secretary of the council, then placed the book of the Gospels on a throne prepared for it on the altar; the archbishop of Iconium and vicar of the Vatican basilica, Puecher-Passavalli, a determined inopportunist, preached the opening sermon, and an hour was consumed by the members in paying the prescribed homage to the pope. After appropriate devotional services all who had not a right to be present at the proceedings of the session left the council hall. Two decrees only were promulgated, the one declaring the œcumenical council of the Vatican duly opened, and the other appointing the next public session to be held on Jan. 6, 1870. There were present 49 cardinals, 9 patriarchs, 4 primates, 123 archbishops, 481 bishops, 6 privileged abbots, 22 abbots general, and 29 superiors general of religious orders; in all, 723 members of the council by right or by invitation. Seven general congregations were held between Dec. 8 and Jan. 6, and were employed both in discussing the prepared *schemata* and in electing the members of the four deputations called for in the letters apostolic of Nov. 27. The deliberations on *schemata* began on Dec. 30, and were confined to questions of discipline. It became clear in the first days of January that among the persons connected with the various deputations and commissions, there were a few who did not scruple to violate the oath of secrecy; and in spite of an admonition to the members of the council, the Augsburg "Gazette" continued to publish letters from its Roman correspondent professing to describe the most secret transactions of the committees. Still no place was given in the *schemata* to the question of infallibility at the beginning of March. Two memoirs presented to the members of the council about this time brought the question of opportuneness to a crisis. The first, bearing no date or printer's name, was entitled *Postulata a pluribus Galliarum Episcopis Sanctissimo D. nostro Pio Papæ IX. et Sacrosancto Concilio Vaticano reverenter proposita*, and concluded with the demand "that no new definitions of faith should be made, except such as were absolutely necessary." The names of the French bishops were not mentioned, but the document was freely circulated among them. The second memoir was a *postulatum* signed by 40 prelates of various countries, asking for a formal and explicit definition of the pope's infallibility while exercising his teaching office toward the entire church; and on March 6 it was officially announced that the commission on *postulata* had recommended and the pope had approved action on this petition, and that a special chapter on this subject should be introduced into the *schema* of the forthcoming constitution "On the Church of Christ." The first discussion on infallibility was fixed for March 18, and the prelates who intended to speak on it in general congregation sent in their names. Meanwhile the French minister of foreign affairs, Count Daru, yielding to the pressure of other governments, wrote to Count de Banneville, the French ambassador in Rome, calling the attention of the pontifical government to the consequences likely to arise from the publication of certain doctrinal decrees on the church and the Roman pontiff, the *schemata* of which had appeared in the Augsburg "Gazette." To this Cardinal Antonelli replied, March 19, that the proposed doctrinal decrees contained only a simple exposition of the fundamental principles on which the church reposes; that they had been again and again insisted on in preceding general councils; that they were especially developed in well known papal constitutions, &c. In the 36th general congregation, March 29, the *prooemium* and first chapter of the schema on faith were unanimously adopted in the form ultimately given to them by the deputation, and all the chapters were adopted before April 12, when the entire schema was put to the vote, every bishop rising in turn, and saying *Placet* or *Non placet*, or *Placet juxta modum* (this last formula implying that he dissented on a part of the matter decreed, or in the mode of formulating it); 595 prelates voted, of whom 515 voted *placet* and 80 *placet juxta modum.* The third solemn session was appointed for April 24. More than 100 amendments or modifications were submitted; but only two were adopted by the deputation on faith, and voted on in the general congregation of April 19. In the solemn session of April 24 the pope ordered that the proceedings should be made as public as possible; the doors of the council hall remained open throughout, and the partitions and enclosures concealing it from the crowd outside were temporarily removed. The constitution "On Catholic Faith," *Dei Filius*, was presented to the pope by Bishop Fessler, and read from the ambon. The vote being taken, 667 members answered to their names, all assenting to the constitution. The constitution "On Catholic Faith" purposes to affirm the existence of the supernatural revealed order, as opposed to rationalism and naturalism. The schema of a first constitution "On the Church" had been adopted by the "deputation on faith" long before the month of April. The theologians intrusted with its preparation had followed the method usually adopted in schools and works on theology; they had embraced all that relates to the institution of the church and its members, before treating of its head and the prerogatives and duties attached to his office. The outside pressure of the prevailing angry discussions caused the council to intervert this order, and to treat of the head of the church and his office from the very beginning. The opportuneness of a definition of the pontifical authority in teaching was deemed evident by the majority; and this once admitted, it became necessary to hasten the work while the council had not decreased in numbers, and before the oppressive heat of summer began. At this juncture the members of the council were divided on infallibility into three classes, the first in favor of an immediate discussion and definition, the second strenuously opposing the introduction of the question, and the third seeking a middle way by obtaining an indirect and implied definition through the condemnation of all errors adverse to the pontifical prerogatives. A *postulatum* in favor of this middle course had been drawn up before the opening of the council by Archbishop Spalding of Baltimore, and was favored by many American prelates; but it was never presented to the proper deputation, and its author and promoters soon joined the first class. Such an indirect definition was, however, perseveringly advocated throughout by Archbishop Darboy of Paris. The second class, or opposition proper, was led by Bishops Dupanloup of Orleans and Strossmayer of Bosnia and Sirmia. In the first class, forming the great majority in the council, there was no one leader. On April 29 the Italian bishops addressed to the council and the pope a collective letter, begging that all other matters should give way to the discussion on infallibility. The same day the deputation on faith referred the matter to the pope, who instantly ordered that the chapters "on the primacy and *magisterium* or teaching office of the Roman pontiff" should take precedence of all others. The discussion on the general question began May 14, and was concluded on June 3. It occupied 15 private sessions of four hours each, and was followed by the special discussion on each chapter, thus affording the opposition an opportunity for renewing their objections. On May 17 all the members of the council received an anonymous pamphlet addressed *Solis Episcopis* (to bishops only), and proposing the consideration of questions as to the sinfulness of concurring in a definition not clearly founded on Scripture and tradition. This, together with the publication in May of *Ce qui se passe au concile*, and toward the end of June of *La dernière heure du concile*, confirmed the determination of the majority. In the general discussion 65 members were heard, nearly all their discourses touching on the fourth chapter, that on infallibility; in the special discussion on the separate chapter, closed on July 4, 56 members spoke on this same subject, and 60 whose names were inscribed renounced their right to speak. More than half of the speakers were inopportunists. On July 11 the vote was taken on the amendments submitted in writing; and on the 13th the constitution *Pastor Æternus*, embodying the entire matter discussed, amended and adopted, was put to the vote in a general congregation. There were present 601 members, of whom 451 voted *placet*, 62 *placet juxta modum*, and 88 *non placet.* On July 15 a deputation composed of the primate of Hungary, the archbishops of Paris and Munich, and the bishops of Mentz and Dijon, had an audience of the pope, and demanded that the words *nixus testimonio ecclesiarum* should be inserted in the decree after the words *cum ex cathedra loquitur*, thus making the official infallibility depend on the previously ascertained testimony of each diocese. As the pope declined to entertain this demand, the prelates wrote him a joint letter, informing him that they persisted in their convictions, and begged permission to return home. On July 17 a letter to the pope, signed by 54 prelates, urged him to interfere at the very last moment and save the church from irreparable evils, by adjourning the council till October, and thereby postponing final action on the question of infallibility. This letter, believed by the signers to be confidential, was not intended for the pope, but was despatched in all haste and printed by the *Gazette de France* July 20, and by the Augsburg "Gazette" on the 22d. At the same time the *agence Havas* announced that the minority had drawn up a protest which was to be published outside of Rome. At the fourth solemn session, July 18, of 536 prelates present only two voted *non placet*, the others voting *placet;* 65 prelates absented themselves. Of the two dissenting bishops, one before leaving the council hall gave in his adhesion to the pope in person. Cardinals Rauscher, Schwarzenberg, Mathieu, and Hohenlohe, inopportunists, who were absent, immediately sent in their adhesion. All the other members of the minority accepted sooner or later the doctrine thus decreed. (See INFALLIBILITY, vol. ix., p. 265.) The rumor of the impending war between France and Germany made the members of the council anxious to return to their flocks. The pope authorized them to do so, with an injunction to return to Rome by Nov. 11. But the events following the capitulation of Sedan, the withdrawal of the French army from Rome, and the occupation of that city by the Italian government, induced the pope to publish, Oct. 20, the bull *Postquam Dei munere*, suspending indefinitely the sessions of the council.—See *Acta et Decreta Sacrosancti et Œcumenici Concilii Vaticani* (Freiburg, 1871); Cardinal Manning, "The Vatican Council and its Definitions" (London, 1871); and M. J. Chantrel, *Histoire du concile du Vatican* (2d ed., Paris, 1872).

VATTEL, Emmeric de, a Swiss publicist, born at Couvet, Neufchâtel, Aug. 25, 1714, died in Neufchâtel, Dec. 20, 1767. He was the son of a Protestant clergyman, and studied at Basel and Geneva. After residing some years in Geneva and Berlin, he received an office at Dresden in 1744; from 1746 to 1758 he represented Augustus of Saxony and Poland at Bern, and then became a privy councillor at Dresden, returning to Switzerland shortly before his death. He wrote in defence of the system of Leibnitz and on other subjects; but his principal work is *Le droit des gens, ou principes de la loi naturelle appliqués à la conduite et aux affaires des nations et des souverains* (2 vols. 4to, Neufchâtel, 1758), which has passed through numerous editions and has been translated into several languages. The best known English translation is that of Joseph Chitty, "Law of Nations, or Principles of the Law of Nature applied to the Conduct and Affairs of Nations and Sovereigns" (London, 1797, many times edited and reprinted in England and the United States). Vattel's last production was *Questions de droit naturel, et observations sur le traité du droit de la nature par M. le baron de Wolf* (Bern, 1762).

VAUBAN, Sébastien Leprestre, marquis de, a French military engineer, born near Saulieu, Burgundy, May 15, 1633, died in Paris, March 30, 1707. In 1651 he enlisted in the army of the prince of Condé, then in arms against the king. Returning to his allegiance, he was made a lieutenant, and in 1655 royal engineer; and during the war against Spain in Flanders he successfully conducted several sieges under Turenne. On the conclusion of peace in 1659 he was employed in improving and constructing fortresses, in which he displayed remarkable skill and originality. In 1667 he was wounded at the siege of Douai. During the invasion of Holland, he took Maestricht and other strongholds (1673–'5) by means of his new system of attack. In 1677 he won new laurels by his capture of Valenciennes and Cambrai. In that year he was made commissary general of fortifications, in which capacity he devised and nearly completed that strong line of fortresses which protects the frontiers and sea coasts of France. In the war against the league of Augsburg he took Philippsburg, Mannheim, Mons, Namur, and other towns (1688–'93). In 1699 he was elected an honorary member of the academy of sciences, and in 1703 was made marshal and conducted the siege of Breisach under the duke of Burgundy. During his military career he improved 300 old fortresses and built 33 new ones, conducted 53 sieges, and took part in 140 battles. His system of attacking a fortified place by regular approaches still practically prevails. As a civil engineer, he constructed the aqueduct of Maintenon, the mole at Honfleur, and several canals in the north and east of France, besides laying out and improving many seaports. Vauban wrote largely on a variety of subjects, and devoted much attention to political economy; but he published only his *Projet d'une dixme royale* (1707), a scheme for the collection from all classes, according to their means, of a single tax in lieu of all others, which the royal council ordered to be suppressed. His principal military writings, edited by Gen. de la Tour Foissac (3 vols., Paris, 1796), comprise his celebrated *Traité de l'attaque et de la défense des places* and *Traité des mines*, originally published at the Hague in 1737, and frequently reprinted separately. A new edition of his *Traité des sièges*, originally published in Berlin in 1747, appeared at Paris in 1829. Among his other works are selections from his manuscripts (the greater part of which has been lost) entitled *Mes oisivetés* (4 vols., Paris, 1843–'6).—See *Notice historique sur Vauban*, by De Chambray (Paris, 1845).

VAUCANSON, Jacques de, a French mechanician, born in Grenoble, Feb. 24, 1709, died in Paris, Nov. 21, 1782. He studied mechanics and anatomy for several years. The statue of the "Flute Player" in the gardens of the Tuileries first suggested to him the project of making an automaton player, and he acquired great celebrity by works of that class. (See AUTOMATON.) Cardinal Fleury appointed him inspector of silk manufactures, and in consequence of his improvements in machinery he was attacked by the workmen of Lyons; he retaliated by constructing an automaton ass weaving flowered silks. He bequeathed his collection to the queen, who gave it to the academy of sciences; it was scattered in consequence of a contest with the mercantile authorities for the possession of the manufacturing machinery, and Vaucanson's most celebrated automatons are now in Germany.

VAUCLUSE, a S. E. department of France, in Provence, embracing the ancient Comtat-Venaissin and the principality of Orange, and bordering on Drôme, Basses-Alpes, Bouches-du-Rhône, Gard, and Ardèche; area, 1,370 sq. m.; pop. in 1872, 263,451. The E. part is traversed by several offshoots of the Alps, the highest point reaching about 6,500 ft.; but in the west the surface is undulating, and there are considerable plains. The principal rivers are the Rhône, which flows on the W. boundary, and its affluents the Durance and Eygues. Iron ore, coal, and potters' clay are found, and there are mineral springs. Some 70,000 acres are occupied by vineyards, which yield a strong red wine of fair quality. The truffles produced are valued at about 4,000,000 francs annually. Silkworms, cattle, and sheep are largely reared. Silks, velvet, woollen cloths, linen, paper, iron, and perfumery are manufactured. It is divided into the arrondissements of Apt, Avignon, Carpentras, and Orange. Capital, Avignon.—The name Vaucluse ("enclosed valley") is derived from the fountain of Vaucluse, the source of the river Sorgue, in a cavern near Avignon. The valley of the upper Sorgue has been immortalized by Petrarch.

VAUD, or **Pays de Vaud** (Ger. *Waadt* or *Waadtland*), a S. W. canton of Switzerland, bounded N. by the canton and lake of Neufchâtel, E. by Fribourg, S. by the canton and lake of Geneva, and W. by France, from which it is separated by the Jura range; area, 1,244 sq. m.; pop. in 1870, 231,700, all Protestants except 17,592 Catholics and about 400 Jews. Capital, Lausanne. The highest Alpine points in the canton are in the S. E. part, and are connected by the Jorat, stretching N. of the lake of Geneva, with the Jura range in the west. The valleys of the latter are remarkable for rich pasture lands and for groves of walnuts. To the abundance of valleys (*vaulx*) is ascribed the origin of the name of the canton. The largest is that of Broye. Northern Vaud is drained by tributaries of the Aar and the lake of Neufchâtel, and southern Vaud belongs to the basin of the Rhône, its drainage flowing to that river and to the lake of Geneva. The latter lake is partly within the canton, and its E. shore is the warmest and most delightful portion. Among the other lakes is Lake Joux, about 3,300 ft. above the sea level and at the foot of some of the loftiest summits of the Jura, Mont Tendre S. E. of the lake being 5,500 ft. high. Southern Vaud is remarkably fertile, and produces excellent wine and fruit, which are largely exported. Large tracts of forest yield a great variety of trees. The salt mines at Bex are next to those of Basel the largest in Switzerland. Watches, musical boxes, tobacco, cigars, and carved wood are manufactured. The great concourse of visitors at Lausanne, Bex, Vevay, and other celebrated places, contributes greatly to the prosperity of the canton. Vaud forms part of *la Suisse romande* or *française*, and French, in a more or less correct form, is generally spoken. The canton is divided into 19 districts, comprising, besides the original territory between the lakes of Geneva and Neufchâtel conquered in 1536 by Bern from Savoy, the district of Bex and Aigle, S. E. of the lake of Geneva, and others on the lake of Neufchâtel, all of which were under Bernese authority till 1798, when with French aid they formed the republic of Leman; and by Napoleon's act of mediation (Feb. 19, 1803), the canton became part of the Helvetic confederation under its present name. The constitution of May 25, 1831, was revised in July, 1845, and thus adopted in August, after the overthrow in February of the local government, which had favored the Jesuits and the Sonderbund. The grand council is the supreme cantonal authority, and acts in conjunction with a council of state chosen by itself; but all laws initiated by the grand council, or proposed by it at the demand of at least 8,000 citizens, must be ratified by a popular vote. Another revision of the constitution in 1861 made it still more democratic.

VAUDEVILLE. See DRAMA, vol. vi., p. 244.

VAUDOIS. See WALDENSES.

VAUDREUIL, a S. W. county of Quebec, Canada, on the S. bank of the Ottawa river, at its entrance into the St. Lawrence; area, 182 sq. m.; pop. in 1871, 11,003, of whom 9,392 were of French, 570 of Irish, 565 of English, and 402 of Scotch origin. It includes Isle Perrot in the St. Lawrence, and is traversed by the Grand Trunk railway. Capital, Vaudreuil.

VAUDREUIL, a French Canadian family with several conspicuous members. **I. Philippe de Rigaud,** marquis de, born in France about 1641, died in Quebec, Oct. 10, 1725. He joined the king's musketeers, and in 1676 rose to the rank of brigadier. He came to America in 1687, served in Denonville's expedition against the Senecas and elsewhere, and obtained promotion. He was also in Frontenac's expedition against Onondaga in 1696, and was sent to ravage Oneida. In 1698 he became governor of Montreal, and in 1703 governor general of Canada. He warred against the Foxes, won the Iroquois to neutrality, baffled English influence in the west, and endeavored to save Acadia; and when Quebec was menaced by Sir Hovenden Walker's fleet he made vigorous preparations to repel him, and, aided by a storm which wrecked a part of the fleet, he was successful. **II. Pierre de Rigaud,** marquis de, fifth son of the preceding, born in Quebec, Nov. 22, 1698, died in Paris in 1764. He entered the military service, was governor of Three Rivers in 1733 and of Louisiana in 1742, and in 1755 was made governor general of Canada. After Braddock's defeat by Beaujeu he erected Fort Carillon, and garrisoned Forts Frontenac, Niagara, and Gaspé. Montcalm captured Oswego and Fort William Henry, and defeated Abercrombie; but the English gradually closed in upon the colony, and the French army was routed on the plains of Abraham. Vaudreuil endeavored to recapture Quebec, and gained one action, but being unsupported by the home government capitulated and went to France. An investigation justified his administration, but he died soon after. **III. Louis Philippe de Rigaud,** marquis de, nephew of the preceding, born in Rochefort, France, Oct. 28, 1724, died in Paris, Dec. 14, 1802. He entered the navy, commanded a vessel in the action between D'Estaing and Byron off Granada in 1779, and in that with Rodney off Martinique, April 17, 1780, and in other actions. He commanded a squadron in De Grasse's fleet in the action with Graves off the capes of the Chesapeake; and in the action with Rodney, April 12, 1782, he saved a part of the fleet, including all his own squadron, and sailed to Boston. He was a member of the states general in 1789, and in the night of Oct. 5–6 defended the royal family at Versailles against the mob. During the reign of terror he resided in England.

VAUGHAN, Henry, a British poet, born in the parish of Llansaintfread, Brecknockshire, South Wales, in 1621, died there, April 23, 1693. He studied at Oxford without graduating, was imprisoned for a time as a royalist, afterward studied medicine in London, and returned to his native place. He called himself the Silurist from the ancient inhabitants of South Wales, the Silures. His works are: "Poems, with the tenth Satyre of Juvenal Englished" (London, 1646); "Silex Scintillans, or Sacred Poems and Private Ejaculations" (part i., 1650; part ii., 1655; new eds., 1847, 1858); "Olor Iscanus" ("Swan of the Usk," a river near his birthplace), a collection printed by his brother (1651); two prose works, "The Mount of Olives, or Solitary Devotions" (1652), and "Flores Solitudinis, or certain rare and elegant Pieces" (1654); and "Thalia Rediviva: the Pass Times and Diversions of a Country Muse, in Divine Poems" (1678).

VAUGHAN, Robert, an English clergyman, born in 1795, died in June, 1868. He was educated for the ministry at Bristol college, was for six years pastor at Worcester, some years later was minister of the Independent chapel at Kensington, and afterward professor of ancient and modern history in University college, London. On the removal of the Independent college from Blackburn to Manchester, he became its president in 1843, at the same time filling the chair of theology. In 1857 he resigned on account of failing health. Soon after his removal to Manchester he projected the "British Quarterly Review," of which he was the editor from 1844 to 1867. Among his works are: "Life and Opinions of John de Wycliffe, D. D." (2 vols. 8vo, 1828), revised and published in one volume with the title "John de Wycliffe, D. D., a Monograph, with some Account of the Wycliffe MSS." (1853); "Memorials of the Stuart Dynasty" (2 vols. 8vo, 1831); "Causes of the Corruption of Christianity" (1834); "Thoughts on the Past and Present State of Religious Parties in England" (1838); "The Protectorate of Oliver Cromwell" (2 vols., 1838); "History of England under the House of Stuart" (2 vols., 1840); "History of Revolutions in England" (3 vols., 1859–'63); and "Memorial of English Nonconformity" (1865).

VAULABELLE, Achille Tenaille de, a French historian, born at Châtel-Censoir, Yonne, in October, 1799. He began life as a journalist, and in 1838 became an editor of the *National.* In 1835 appeared his *Histoire de l'Égypte moderne* from 1801 to 1833, and in 1844 his *Histoire des deux restaurations jusqu'à l'avénement de Louis Philippe* (3d revised ed., 8 vols., 1864). The provisional government of 1848 offered to send him as minister either to London or to Berlin, but he preferred to take his seat in the constituent assembly, and served on the committee for drawing up the new constitution and as chairman of that on education, and was minister of education from July to October. He opposed the policy of Louis Napoleon, and lost his seat in the elections of December, 1851. He has since written historical works on Louis Philippe's government, on the republic of 1848, and on the second empire.—His brother, ÉLÉONORE DE VAULABELLE (1802–'59), wrote *M. de Similor en Californie* (2d ed., 1856), and was a joint author of vaudevilles under the name of Jules Cordier.

VAUNKS. See CAPE RIVER.

VAUQUELIN, Louis Nicolas, a French chemist, born in Normandy, May 16, 1763, died Nov. 14, 1829. He was employed by an apothecary in Rouen previous to his removal to Paris in 1781, where he studied pharmacy, and became Fourcroy's assistant. After acting in 1793 as chief pharmaceutist in the military hospital at Melun, he became in 1794 inspector and professor of docimacy in the mining school of Paris, and then assistant professor of chemistry in the polytechnic school. On succeeding Darcet in the chair of chemistry at the collége de France, he became director of the new school of pharmacy, and subsequently professor of chemistry in the *jardin des plantes,* finally succeeding Fourcroy in the same capacity in the faculty of medicine. His discoveries, among which those of chromium and glucina deserve special notice, have been useful. He published several works on subjects connected with chemistry, and alone and jointly with Fourcroy made more than 200 contributions to periodicals.

VAUTIER, Benjamin, a Swiss painter, born in Geneva in 1830. He studied in Düsseldorf, and became known by admirable genre pictures relating to the domestic life of Switzerland and Swabia. Between 1858 and 1864 he exhibited "Devout Singers in a Church," "A Party embarking on a Rhine Steamer," "A Solitary Spinning Woman," "A Wife's Surprise on meeting her Husband in a Tavern on her way from Church," "A Sunday Afternoon in Swabia," and "Cats in a Criminal Case," one of his masterpieces. His "Courtier and Peasants in Würtemberg" (1865) appeared among his pictures at the Paris exhibition of 1867, where he received a medal. His subsequent productions comprise "The Antiquary among the Peasantry," "The Wake, or Feast after a Burial, in the Bernese Highlands" (1866), "The First Dancing Lesson in a Village of the Black Forest" (1868), "The Interrupted Quarrel" (1869), "Drinking the Bride's Health," "A Public Dinner," and "A Village Funeral" (1871). He has made designs for an episode of Immermann's *Münchhausen.*

VEDA, the general designation of the scriptures of the Brahmanic religion. The word means "knowledge," the Vedas being considered to contain the knowledge of all knowledge. The Veda texts or Veda Sanhitâs exist in four collections, Rig-Veda, Sâma-Veda, Yajur-Veda, and Atharva-Veda, for the general character and contents of which see INDIA, RELIGIONS AND RELIGIOUS LITERATURE OF. About the Vedas themselves clusters an immense religious literature. Among the earliest books written in explanation of the Sanhitâs are the Brâhmanas, which are mostly confined to descriptions of the ceremonies prescribed, and relate numerous legends bearing on them. Collections of practical rules regarding matters of worship were also made; these are called Sûtras. Vedângas, or members of the Vedas, comment upon the language, mythology, and astrology of the Sanhitâs; and the Vedântas, or purpose of the Vedas, are philosophical disquisitions on the Brahmanic religion. The word *shastra* (*s'astra*) is often added to these terms, as Vedânta-shastra. *Shastra* signifies treatise, book, precept, and hence Vedânta-shastra is a work on the Vedânta philosophy or the whole body of teaching on that subject.—The four hymn texts of the Vedas have all been published in Europe, the Rig-Veda in three different forms. Of the Rig-Veda, Langlois has published (Paris, 1848-'51) a very poor French translation; Wilson's (London, 1850-'57, continued and to be completed by Cowell) is better, but represents the commentators rather than the hymns themselves. Müller has published (1869) the first volume of a fully annotated version, but it contains only 12 hymns. Benfey has translated about 130 hymns in the *Orient und Occident.* J. Muir's "Original Sanskrit Texts" (5 vols., London, 1863-'70) gives the transliterated texts and literal version of a great many hymns and parts of hymns. A German translation of the Sâma-Veda accompanies Benfey's edition (Leipsic, 1848). Two books of the Atharva-Veda are rendered into German by Weber, in his *Indische Studien.* The most important Brâhmanas have also been published: the Çatapatha by Weber; the Aitarêya by Haug (Bombay, 1863, with translation); the Taittirîya by Mitra (Calcutta); the principal Upanishads, with commentary and translation, in the *Bibliotheca Indica* at Calcutta.—For the Vedas in general, see Colebrooke's essay in the "Asiatic Researches," vol. viii., and in his collected essays (2d ed., with detailed notes by W. D. Whitney); Roth, *Zur Literatur und Geschichte des Veda* (Stuttgart, 1846); Weber, *Indische Literaturgeschichte* (Berlin, 1852); Barthélemy Saint-Hilaire, *Des Védas* (Paris, 1854); Max Müller, "History of Ancient Sanskrit Literature" (London, 1859); and W. D. Whitney, in the "Journal of the American Oriental Society," vols. iii. and iv., and in "Oriental and Linguistic Studies," vol. i.

VEDDER, Elihu, an American artist, born in New York in February, 1836. He studied under Matteson, spent several years in Italy, and afterward opened a studio in New York and devoted himself to genre painting. He subsequently returned to Europe, and now (1876) resides in Rome. Among his best pictures are "The Lair of the Sea Serpent," "The Arab Listening to the Sphinx," "St. Simeon Stylites on his Pillar," and "The Monk upon the Gloomy Path."

VEGA, Garcilaso de la. See GARCILASO DE LA VEGA.

VEGA, Georg von, baron, a German mathematician, born at Sagoritza, a village in Carniola, in 1756, murdered in 1802. He studied in Laybach, joined first the navy, then the army, and in 1784 became a military instructor in mathematics. He distinguished himself in the wars against the Turks and the French, and was ennobled in 1800. His dead body was discovered in the Danube, Sept. 26, 1802, and 30 years later it was brought to light that he had been thrown into the river by a miller while walking on its bank. His *Vorlesungen über die Mathematik*, *Logarithmisch-trigonometrisches Handbuch*, *Thesaurus Logarithmorum completus*, *Anleitung zur Zeitkunde*, *Natürliches Mass-*, *Münz- und Gewichtssystem*, and *Logarithmentafeln* have been many times republished; the last named work reached in 1876 its 57th edition.

VEGA, Lope de (LOPE FELIX DE VEGA CARPIO), a Spanish dramatist, born in Madrid, Nov. 25, 1562, died there, Aug. 26, 1635. Shortly before his birth his father had removed to the capital from his ancestral domain of Vega, in the valley of Carriedo, and died while his son was very young. His uncle, the inquisitor Miguel de Carpio, enabled him to cultivate his extraordinary and precocious faculties at the royal college; and after an escapade from that institution, during which he served against the Portuguese, he was patronized by the bishop Manrique of Àvila. He took his bachelor's degree at Alcalá, became secretary to the duke Antonio of Alva, and married Isabel de Urbino, daughter of the king-at-arms. He was imprisoned on account of a duel and then exiled from Madrid, spent several years in the celebrated literary circles of Valencia, and became a widower in less than a year after his return. In 1588 he joined Philip II.'s armada against England. Shortly before his second marriage in 1597 with Juana de Guardio, he held for the last time a secretaryship, under the same marquis of Sarria who as count de Lemos became known as Calderon's munificent patron. His domestic happiness was after several years interrupted by the death of a son, and of his wife in giving birth to a daughter. After an illicit alliance with Maria de Luxan, who bore him a son who died early and a daughter who became a nun, he joined a lay religious body, and in 1609 became a priest; in 1610 he joined the same brotherhood to which Cervantes afterward belonged, and in 1625 entered a congregation at Madrid, which in 1628 elected him chief chaplain. As early as 1609 he had styled himself a servant of the inquisition (*familiar del santo oficio*), and he produced most of his pieces during his connection with the church. Hypochondria imparted to his last religious poems a melancholy degree of fanaticism, and on his deathbed he deplored that he had ever been engaged in other than religious occupations. He left his manuscripts to his especial patron the duke of Sessa, who provided for his funeral, which lasted nine days. His fertility and rapidity of execution were fabulous. He wrote about 1,800 plays, besides hundreds of *autos*. About 300 of the former are contained in 28 volumes (1604–'47), and 112 in *Comedias escogidas*, edited by Hartzenbusch in the *Biblioteca de autores españoles*. His intense patriotism, faithful delineation of popular life, and admirable versification made him exceedingly popular, although he disregarded all sense of propriety and of chronological accuracy in his effort to produce an interesting plot. His dramatic genius embraced the whole range of the art. He first divided the secular from the religious drama, and introduced other modifications and improvements in the stage. Among his best known pieces are *Los tres diamantes*, *La fuerza lastimosa*, *La discreta enamorada*, *La dama melindrosa*, and *El padre engañado*, the last adapted to the English stage by Holcroft ("The Father Outwitted"). His epic poems were soon forgotten, but among his innumerable minor poems are several of superior merit. A select edition of his prose and poetry appeared at Madrid in 1776–'9 (21 vols.), and Hartzenbusch has edited his *Obras no dramáticas* in the above mentioned collection (1856).—Among the Spanish authorities on Lope de Vega are his friend Montalvan and Navarrete; in English, Southey, Lord Holland, and especially Ticknor in his "History of Spanish Literature."

VEGETABLE IVORY TREE. See PHYTELEPHAS.

VEHMIC COURTS (Ger. *Vehmgerichte* or *Femgerichte*, from old Ger. *Fem*, punishment, and *Gericht*, tribunal), secret tribunals which flourished chiefly in Westphalia during the middle ages. They are not mentioned by name before the 13th century, but there are some traces of their existence in the 12th, and as some historians believe even in the 9th century. Westphalia was the home of these courts, and only upon the "red earth," as its soil was called in Vehmic phraseology, could their members be initiated or their sittings be held. The tribunals were at first a protest against the arbitrary decisions of the lawless barons and nobles. The emperor and the nobles of his court, and with them men of all ranks, associated themselves together for the formation of free tribunals (*Freigerichte*), composed of elected "free judges" (*Freischöffen*, or *Freischöppen*), to try persons accused of crimes against persons or property. They were bound by solemn oaths not to reveal the circumstances of the trial or the sentence passed on the offender if found guilty; and in order to be one of the brotherhood, the applicant must be of good reputation, and must have two sureties who were already free judges. The initiated recognized each other by signs. The courts might be summoned at any time and in any place in Westphalia, in public or private buildings, in the forests or caves, or in the open fields; they were sometimes held publicly, in the presence of the people, but usually they were closed against all but the initiated and the accused person. The emperor, or in his absence the count or noble of highest dignity, presided, though in some instances men of common birth sat as chief judges, even when those of higher rank were present. If any uninitiated person intruded, he was immediately put to death. Before the chief judge lay the emblems of his authority, the sword and the cord. In the early history of the organization, the accused could be absolved by taking a solemn oath of purification upon the handle of the judge's sword; but when at a later period it was found that criminals did not hesitate to perjure themselves, the accuser, always a free judge, could substantiate his charge even against the oath of the accused by three or more witnesses. If the accused could rebut these by a number one half greater, he was still discharged; but if condemned, sentence was passed upon him, and he was forthwith hanged. If the person accused had not been arrested, he was summoned to appear by fastening upon his door or gateway the summons of the Vehmic court, enclosing in it a small coin. If he had no known or certain residence, then these written summonses were posted at the crossing of four roads nearest his haunts. If he failed to appear or to send a messenger, he was condemned as despising the jurisdiction of the holy Vehm, and once condemned there was little chance of his life while he remained in Germany. In the 14th and 15th centuries the free judges were more than 100,000 in number, scattered over every part of Germany. The condemnation of an offender by a Vehmic court was known to the whole brotherhood in a very short time; and if it were the father, brother, or son of one of the initiated who was condemned, he not only might not warn him of his danger, but was bound to aid in putting him to death under penalty of losing his own life. When slain he was to be hanged on the nearest tree, nothing of value which he might have about him being removed, and a knife being thrust into the earth near him as an indication that his death was the result of a sentence of the Vehmic court. A power so formidable, and exercised under such obligations of secrecy, soon raised the hostility of those who feared becoming its victims, as well as of those who saw in it an engine capable of terrible oppression. In 1371 the emperor Charles IV., in an instrument known as the public peace or pact of Westphalia, stipulated for the recognition of the Vehm; but in the next century the number of its opposers greatly increased, and in 1461 an association was formed among the cities and princes of Germany and the cantons of Switzerland to resist the free judges, and to require that the trial of accused persons should take place in open day. In 1495 Maximilian I. established a new criminal code, which materially weakened the power of the Vehmic courts; and in the 16th century they were but seldom held. The last public sitting was in 1568, near Celle; but there were secret sittings of the court in the 17th and 18th centuries, and according to Kohlrausch even as late as 1811, in Münster. But they ceased to excite terror or to exert any considerable influence before the close of the 17th century.—Kopp, *Verfassung der heimlichen Gerichte in Westphalen* (Göttingen, 1794); Hutter, *Das Vehmgericht des Mittelalters* (Leipsic, 1798); and Wigand, *Das Vehmgericht Westphalens* (Hamm, 1825).

VEHSE, Karl Eduard, a German historian, born in Freiberg, Saxony, Dec. 18, 1802, died near Dresden in June, 1870. From 1825 he held office in the department of archives at Dresden, and became its chief in 1833. In 1828 appeared his *Geschichte Kaiser Otto's des Grossen* (2d ed., 1865), and in 1834 his *Tafeln der Welt- und Culturgeschichte.* He accompanied the separatist Stephan to the United States about the beginning of 1839, but returned home at the end of that year, and after travelling in Europe settled in Berlin. He was imprisoned six months and expelled from Prussia for disparaging the royal family in his *Geschichte der deutschen Höfe seit der Reformation* (48 vols., Hamburg, 1851–'8; partly translated into English by Demmler, 1854–'6). He became a naturalized Swiss in 1857, and during his last years lived alternately in Italy and Saxony.

VEII, one of the 12 cities of the Etruscan confederation, the largest and most powerful of all, on the Cremera, a small affluent of the Tiber, near the present town of Isola Farnese, about 10 m. N. N. W. of Rome. Its territory seems to have extended from the mouth of the Cremera to the Ciminian forest, and from Mt. Soracte to the Tyrrhenian sea. Veii was a great city long before the foundation of Rome, and was for centuries her rival in power, until it was destroyed about 396 B. C. by the Romans under Camillus. When soon after Rome was destroyed by the Gauls under Brennus, the Roman people were prevented by Camillus from removing to Veii and rebuilding it instead of their own city. It was repeopled under Augustus, but relapsed into decay, and disappeared from history.

VEIN, in mineralogy. See MINERAL DEPOSITS.

VEINS, the name applied to four systems of blood vessels, differing in structure, course, and function, and having in common only the character of conveying blood toward and not from the heart. These systems are the common systemic, the portal, the pulmonary, and the umbilical, the first two circulating impure or venous, and the last two pure or arterial blood. As to the special anatomy of the general venous circulation, it will be sufficient to say here that all the veins from the lower limbs and the pelvic and abdominal organs carry their contents into the inferior vena cava, and those of the head, upper limbs, and thorax into the superior vena cava; that these two great vessels pour their blood into the right auricle of the heart, whence it enters the right ventricle, to be sent by this through the pulmonary artery to the lungs for purification, returning arterial by the pulmonary veins to the left auricle, and thence by the left ventricle and aorta over the body.—The principal superficial vein of the side of the neck is the external jugular, in which venesection is occasionally performed; it is very conspicuous in some persons during violent agitation of body or mind. The deep-seated internal jugular, by the side of the carotid artery, receives the blood from the sinuses of the brain; the median basilic at the bend of the elbow is the classical one for venesection, being very accessible and of considerable size; the longest vein in the body is the internal saphena, extending from below the ankle joint to within about an inch of the groin; the other veins as to their course generally follow the arteries; the heart has its own system of veins, not communicating with the venæ cavæ, but opening directly into the right auricle. These systemic veins, as they are called, correspond to the branches of the aorta, and grow larger and larger toward the heart. The portal veins collect the blood from the small vessels of the abdominal viscera into one, the vena portæ, which subdivides like an artery within the liver. In the pulmonary circulation, by a contradiction in terms, the vessel called the artery carries venous blood, and the veins arterial blood.—Veins are generally thinner, less elastic, and of larger calibre than the corresponding arteries, and are provided with membranous folds or valves to prevent a backward flow of the blood. In vertebrates generally they consist of an external fibrous and areolar coat, a middle or muscular, and an internal fibrous lined with fenestrated or striated membrane and epithelium. Venous capillaries do not essentially differ from arterial, consisting of tubes of homogeneous membrane, with a few oval nuclei; the veins of the brain have no muscular coat; at their junction with the heart they are more muscular, thicker, and red, from a prolongation into their structure of the muscle of the auricle, and they have also a partial investment of the serous layer of the pericardium; where the vena cava pierces the diaphragm it has a covering of fibrous tissue; the cerebral veins or sinuses are tubular excavations in the substance of the dura mater, lined with the usual internal membrane; the umbilical vein is smooth, without valves, lined with epithelium, and composed of a thick fibrous mass. Veins have their nutrient vessels, and a very few nerves. The venous system is far more extensive than the arterial, both in the size and number of the vessels and their branches. The veins arise in the capillaries, increasing in size and diminishing in number toward the heart. (See Capillary Vessels.) The veins which return the blood from some of the erectile tissues were thought at one time to begin in little sacs, into which arteries much larger than capillaries open; but recent investigations have shown that the appearances were deceptive, and that, although the capillary system of erectile tissue is peculiar, having tortuous enlargements and *lacunæ*, the ordinary arrangement of direct passage from arteries to veins through the capillaries exists. Veins intercommunicate very freely, forming networks and plexuses, the most remarkable of which in man are those about and within the spinal canal. The veins are passive organs, determining by the contraction of the muscles the course of the blood; they are also reservoirs for the circulating fluid, and active agents in absorption; as reservoirs, though very important in man, they are most remarkable in the lower animals, as in seals, whales, and many diving birds.—The valves in veins are interesting not only as specimens of animal mechanics, but as having in a great degree suggested to Harvey the discovery of the circulation of the blood; these are raised portions or pockets of fibrous membrane lined with epithelium, very delicate, and in the most perfect semilunar shape; there are generally two together in the larger vessels, opening toward the heart, and when in contact completely preventing the regurgitation of the blood; at the orifices of the smaller veins they are often single, and in the great vessels of the larger mammals frequently three; there are none in the capillaries, though they exist in veins of half a line in diameter; they vary from a mere linear elevation to a deep pocket. Their situation is irregular, and their number not very great; in man they are found in veins subject to muscular pressure, and are therefore most numerous in the limbs; in the head and neck there are but two, in the external jugular, and these not very perfect; in the arm they are most numerous at the upper part, with none in the subclavian, innominata, and superior cava; in the legs they are most abundant at the lower part; there are none in the spinal veins, in those of the portal and hepatic systems, in the heart, kidneys, uterus, and lungs, as a general rule; they are few in cetaceans and birds, and almost absent in reptiles and fishes.—Veins are more subject to diffuse inflammation than arteries, and, from their active absorbent powers, morbid materials are carried rapidly and widely over the system from the heart. Phlebitis, or inflammation of their lining membrane, is a dangerous and common disease, sometimes leading to fatal purulent absorption, and frequently to obliteration of the vessel. Varix or dilatation of a vein, from the comparatively small amount of circular fibres, is one of the most frequent of the morbid conditions of the body. (See Varicose Veins.) Small earthy concretions are not unfrequently deposited in the walls of veins from the blood; they are named phlebolithes or vein stones, and consist chiefly of phosphate and carbonate of lime. Entozoa are often found in the interior of the veins in the lower animals. A vein if wounded, either accidentally or in venesection, heals readily, without interference with its functions; but a wound in the axillary, subclavian, or lower part of the internal jugular, during a surgical operation, may prove suddenly fatal from the sucking in of air and a consequent instantaneous paralysis of the heart's action.

VEIT, Philipp, a German painter, born in Berlin, Feb. 13, 1793. His mother was the daughter of the philosopher Mendelssohn, who after the death of her first husband married Friedrich Schlegel. He completed his studies in Rome, where he was associated with Cornelius, Overbeck, and other German painters in the attempted revival of mediæval art; and he executed in the villa of the Prussian consul, J. S. Bartholdy, the fresco representing the "Seven Years of Plenty," as a companion piece to Overbeck's "Seven Years of Famine." In 1826 he became director of the Städel art institute at Frankfort, and produced works in oil and fresco, which are among the most characteristic productions of modern German art. His masterpiece is a fresco in the institute representing "Christianity bringing the Fine Arts into Germany." Such was his dislike of the new realistic school, that on the purchase in 1843 of Lessing's "Huss before the Council of Constance" for the institute, he resigned his office, and settled in Sachsenhausen, opposite Frankfort. Among his subsequent productions are an "Assumption of the Virgin" for the Frankfort cathedral, and "The Marys at the Sepulchre," "The Parable of the Good Samaritan," and "The Egyptian Darkness," for the king of Prussia.

VELA, Vincenzo, an Italian sculptor, born at Ligurnetto, in the Swiss canton of Ticino, in 1822. He was brought up as a stone cutter, but perfected himself in Milan as a sculptor, and in 1844 won a competitive prize at Venice. After his return from the Italian war against Austria (1848) he refused to join the academy of fine arts at Milan, and settled in Turin. His works include statues representing "A Prayer," "Spartacus," "Hope and Resignation," "Music in Tears" (for Donizetti's funeral monument at Bergamo), "France and Italy" (a group presented in 1863 by the ladies of Milan to the empress Eugénie), and "Columbus and America" (a colossal group in plaster). His masterpiece, representing the last days of Napoleon at St. Helena, attracted much attention at the Paris exhibition of 1867, and is now in the metropolitan museum of art, New York.

VELASQUEZ, Diego Rodriguez de Silva y, a Spanish painter, born in Seville in June, 1599, died in Madrid, Aug. 7, 1660. He was of Portuguese origin on the father's side. While a child he studied under the elder Herrera, whose harshness caused him to enter the school of Francisco Pacheco, but with little advantage excepting his marriage with his master's daughter; and he was in reality self-taught. His chief model was a peasant boy, whom he painted in his rags in every variety of expression and attitude; and he also excelled in painting fruit, fish, and other common objects of still life. His works of this period exhibit great breadth and force, but no attempt at ideal or poetical expression. A well known specimen, "The Water Carrier," is in the collection at Apsley house, London. In 1622 he went to Madrid, and in 1623 was employed to paint the portrait of Olivarez, the minister of Philip IV. The king was his next sitter, and the picture was exhibited on the steps of the church of San Felipe, and greatly admired. Velasquez was immediately appointed court painter, with a regular salary in addition to the payments for his works, and is said to have received the exclusive privilege of portraying the king on canvas. In 1627 his "Expulsion of the Moriscoes from Spain" gained him the appointment of usher of the chamber. He became intimate with Rubens during that artist's embassy at Madrid. From 1629 to 1631 he was in Italy, and studied diligently the works of Raphael, Michel Angelo, and the other great masters; but the two works which he sent home from Rome, "Jacob with the Garment of Joseph" and "Apollo at the Forge of Vulcan," exhibit no trace of Italian influence. On his return to Spain, Philip established him in the palace, and sat to him for a celebrated equestrian portrait. In 1648–'51 he was again in Italy, to collect pictures and statuary for the king, and while in Rome painted a portrait of Innocent X. Subsequent to his return to Madrid he produced some of his finest works, including the celebrated *Meninas*, representing the infanta Margarita and her maids of honor, which, in respect to aërial and linear perspective, local color, and animal and human life, is held to be almost unrivalled. In 1652 he received the exalted post of *aposentador mayor* (chief chamberlain), which required him to be constantly in attendance on the king, and interfered with his painting. In the spring of 1660, while engaged in arrangements for the royal family at the isle of Pheasants, on the frontiers of France, he was seized with a tertian fever, of which he died. His wife died of grief a week afterward.—Owing to the fact that Velasquez painted almost exclusively for the king, and that his pictures, being royal property, were generally respected by Napoleon's commanders, he is still to be seen to advantage only in Madrid. The royal gallery there contains about 60, comprising portraits, history, genre, and landscape, in all of which he was equally great. In delineations of female beauty, and in subjects demanding an elevated ideal or poetical treatment, he was less successful; and his pictures of this class, although powerful, are inferior to those of Murillo. His "Surrender of Breda" or *Las lanzas* ("The Lances"), remarkable for the feeling and expression of the figures and the technical execution, was etched in 1875 by the French artist Laguillermie. Of his genre pictures, the celebrated group entitled *Los bebedores* ("The Drinkers") is regarded for its humor alone as entitling Velasquez to the name of the "Spanish Hogarth."—See Sir William Stirling (Maxwell), "Annals of the Artists of Spain" (3 vols., London, 1848), and "Velasquez and his Works" (1855).

VELDE, Franz Karl van der, a German novelist, born in Breslau, Sept. 27, 1779, died there, April 6, 1824. He held judicial offices in various places, and wrote poems and plays, but was chiefly known by his novels, the principal of which are *Guido*, *Die Eroberung von Mexico*, *Die Malteser*, *Die Wiedertäufer*, *Arwed Gyllenstierna*, and *Christine und ihr Hof.* His complete works have been published in 27 vols. (Dresden, 1830–'32).

VELIA, or **Elea,** an ancient Greek city on the W. coast of southern Italy, believed to have been settled by Ionian colonists from Phocæa about 544 B. C. Like their compatriots in Massilia, they were celebrated for commercial enterprise. The city was the birthplace of the philosophers Parmenides and Zeno, the disciples of Xenophanes of Colophon, and with him founders of the Eleatic school of philosophy. (See ELEATIC SCHOOL.) Under the Roman republic it was mainly noted as a pleasant resort on account of its fine climate. It was an episcopal see from the early ages of Christianity till the end of the 6th century. Its subsequent destruction has been ascribed to the ravages of the Saracens during the 8th and

9th centuries. The ruins of Velia are on a low ridge about 1½ m. from the mouth of the Alento (anc. *Hales*), in the province of Principato Citeriore and ½ m. from the coast. A mediæval castle and the village of Castellamare della Bruce or Brucea mark the site of the ancient city. Excavations were undertaken here in 1874 by Salazaro.

VELLEIUS PATERCULUS. See PATERCULUS.

VELLETRI (anc. *Velitræ*), a town of central Italy, at the foot of Mt. Artemisio, in the province and 20 m. S. E. of the city of Rome; pop. about 13,000. It has a fine cathedral and several public and private palaces. Wine and olives abound in the vicinity. Originally it was a Latin or Volscian city of considerable importance. According to inscriptions described by Cardinali (Rome, 1823), it had an amphitheatre and fine temples. Garibaldi defeated the Neapolitans here in March, 1849. Velletri was the capital of a papal delegation till 1870, when it was incorporated with the kingdom of Italy.

VELLORE, a town of British India, in the district of North Arcot, Madras, on the S. side of the river Palar, in lat. 12° 55′ N., lon. 79° 11′ E., 79 m. W. S. W. of the city of Madras, and 16 m. W. of Arcot; pop. about 50,000. It is tolerably clean and well built, a place of considerable trade, and a station on the railway from Madras to the W. coast. About a mile N. of the town is an extensive fortress. In the public square there is a fine Hindoo pagoda, built about four centuries ago. The climate is intensely hot, but healthful.—Vellore was founded by the rajah of Bijanagur in the latter part of the 15th century. Sevajee took it from his descendants in 1677; and it fell into the hands of the British when they obtained possession of the Carnatic. On the fall of Seringapatam it was selected as the residence of the sons and family of Tippoo Sultan. On July 10, 1806, the sepoys rose in mutiny at Vellore and killed 13 officers and 100 men of the European garrison.

VELLUM. See PARCHMENT.

VELOCIMETER, an instrument for measuring the velocity of projectiles. Prior to 1840 such measurements were made by suspending a gun in a pendulum, and observing the arc described in its recoil. This gave the means of computing the velocity imparted to the projectile, with a probable error of a very few feet per second. In 1840 Wheatstone suggested the use of electricity for obtaining the data required for the computation, and for a quarter of a century it has been used exclusively. The velocity of a moving body becomes known when we know the time it takes to pass through a measured portion of its path. The space is determined by merely choosing certain points (usually about 100 ft. apart) in the path of the projectile, and measuring the distance between them. The time required to pass over this distance therefore becomes the sole object of inquiry; and a velocimeter is merely an instrument for measuring with extreme accuracy small intervals of time. To accomplish this, a screen of fine wire carrying an electric circuit is placed at each end of the measured interval, in such manner that the passing projectile shall rupture the two circuits, and the two ruptures instantly telegraph themselves to a machine, which records them in such a way that the interval of time between them can be immediately read. The recording instrument is called a chronograph. The number and variety of chronographs are very great, but they all involve one mechanical principle, viz.: the records must be made by means of parts of the machine moving at rates which are known with great exactitude, during intervals which begin and terminate with the two ruptures respectively. This may be illustrated by the following contrivance, which is a modification of the Navez chronograph by Col. J. G. Benton of the United States ordnance department. It consists of a vertical metallic semicircle, *b*, graduated with the ordinary circular units and supported upon a bed plate, *a*. Two pendulums, *p p′*, are swung upon the axis of the arc, and have their mass so distributed that their times of oscillation are equal. When deflected in opposite directions from a vertical position to 90°, they touch the magnets *m m′*, which hold them in the new or horizontal position. The magnets are excited by circuits, *c c*, *c′ c′*, which pass through the wire screens in front of the gun. If they were both ruptured at the same instant (the instrument being perfectly adjusted), the pendulums would be simultaneously released, and would pass each other opposite the zero mark at the lowest point of the graduated arc; but being ruptured successively, they pass at some point more or less distant from it, this distance being dependent upon the length of the interval of time between the two ruptures. To mark the point where this passage occurs, a stud, attached to the pendulum *p*, strikes the oblique head of a pin attached to a lever in the other pendulum, and causes it to make an indentation or an ink mark upon a piece of paper clamped to the graduated arc, leaving a record of the angle of deflection of the two pendulums at the instant of passage. By a simple formula the interval between ruptures can be computed from this angle.—A very simple form of velocimeter, probably used more extensively than

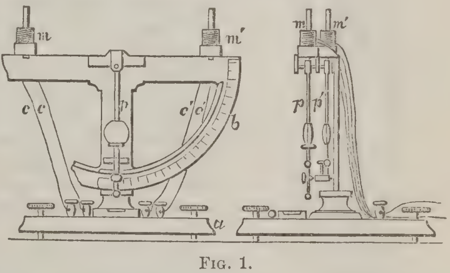


FIG. 1.

any other, is that invented by Capt. Le Boulengé of Belgium. A metallic standard, S, fig. 2, sustains two electro-magnets, A B. The magnet A, when excited, holds a bar C as its armature, called the "chronometer." A zinc tube, D, removable at pleasure, fits over the latter. The magnet B holds a smaller armature, F, called a "registrar;" and immediately beneath it is an apparatus, L, holding in tension a cocked main spring, which carries a knife edge. After the relative altitudes of the two magnets have been adjusted, the knife edge is caused to make an indentation upon the zinc tube of the chronometer for a zero mark, and then the machine is ready for the record. The magnet holding the chronometer is excited by the circuit through the screen nearest to the gun, and the registrar magnet by the other circuit. When the first is ruptured the chronometer falls; when the second is ruptured the registrar falls, springing the knife edge and causing a cut to be made in the zinc tube. The space between this cut and the zero mark gives, by the formula for falling bodies, the time interval between the two ruptures.—The two machines described are capable of showing the velocities of projectiles with great precision, their mean errors not exceeding $\frac{1}{10,000}$ of a second. Col. Benton has used his machine without the aid of electricity. In place of electro-magnets to hold the pendulums and release them, he has employed springs kept tense by means of cotton threads. The threads, being ruptured by the passing shot, release the springs, which dismiss the pendulums. The results so obtained are but little less accurate than those with electro-magnets. Velocimeters are also used for obtaining data by which the resistance of air to the motion of projectiles may be determined. There is no known method of computing it, and the only resource is to measure it directly. This the velocimeter enables us to do by showing how much a projectile is retarded in passing over a series of intervals. But for each set, and for each velocity, a separate trial must be made. The determination of the velocity through a succession of intervals requires a chronograph of much more complicated structure than the simple ones described, for it must record the times of rupture of half a dozen circuits, or of half a dozen ruptures of the same circuit. Usually the screens are all placed in the same circuit, which renews itself after each rupture, before the shot reaches the next screen. The recording device consists of a cylinder or disk revolving at a known rate, and receiving at the instants of rupture some visible marks from a stationary device or tracing point controlled by the current. The most ingenious application of the velocimeter yet made is the measurement of the varying velocity of a projectile in the bore of a gun, which has been accomplished by means of a special apparatus devised by Capt. W. H. Noble of the British army, and also by a series of Le Boulengé chronographs.

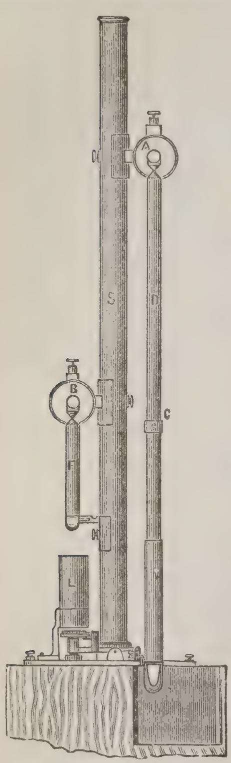


FIG. 2.

VELOCIPEDE (Lat. *velox*, swift, and *pes*, foot), a light carriage so constructed that it may be swiftly propelled by the feet of a person mounted upon it. In its earliest form it was invented at Mannheim in 1817 by Karl von Drais, and called a *draisine*. As then constructed, it consisted of a bar about 5 ft. long and 6 in. wide, supported at each end upon a single wheel, the front one being so attached that it could be turned to the right or left like the front wheels of an ordinary carriage. The rider sat astride of the bar and propelled himself and the machine by the action of his feet upon the ground. The vehicle in that form did not come into use, but about 1867 it was improved and became a favorite with amateur gymnasts. A saddle was fixed upon the longitudinal bar, and a foot crank was placed upon each side of the forward wheel to serve for propulsion. The machine is kept in position by the action of the rider's body and limbs, and also by its own momentum in a certain plane. As recent examples of rapid riding the following may be cited: 1 mile in 3 minutes, by J. Keen in a match with Frederick Cooper for the championship at Queen's grounds, Sheffield, England, Sept. 18, 1875; 50 miles in 3 h. 9 m. 21 s., by J. Keen at Molineux grounds, Wolverhampton, Nov. 30, 1874, including stoppages; 100 miles in 7 h. 35 m. 43 s., by David Stanton, at Lillie Bridge grounds, Oct. 19, 1874; 132 miles in 17 h. 15 m., by J. T. Johnson, including all stoppages, from London to Worthington and back.

VELPEAU, Alfred Armand Louis Marie, a French surgeon, born at Brèche, department of Indre-et-Loire, May 18, 1795, died in Paris, Aug. 24, 1867. He was brought up to assist his father, who was a farrier, learned almost without assistance reading, writing, and some of the rudiments of medicine, acquired reputation among the peasantry by several cures, and was enabled by a neighbor to study in the hospital of Tours, where he graduated in 1823. In 1830 he became surgeon to the *Pitié* hospital at Paris, in 1832 a member of the academy of medicine, in 1835 professor of clinical surgery, and in 1842 successor of Larrey in the institute. His clinical lectures at the *Charité* hospital were among the most remarkable of his claims to distinction. His works include *Traité de l'anatomie chirurgicale* (2 vols., 1825); *Anatomie des régions* (1825–'6; revised and republished under the title *Anatomie chirurgicale générale et topographique*, 2 vols. 8vo, 1838; 2d ed., by Velpeau and Béraud, 1862); *Mémoire sur les positions vicieuses du fœtus* (1830); *Recherches sur la cessation spontanée des hémorrhagies traumatiques primitives et la torsion des artères* (1830); *Nouveaux éléments de médecine opératoire* (1832), a work of the highest authority; *Embryologie ou ovologie humaine* (1833); *Des convulsions, pendant la grossesse, durant le travail, ou après l'accouchement* (1834); *Leçons orales de clinique chirurgicale*, collected by Jeanselme and Pavillon (3 vols., 1840–'41); and *Traité des maladies du sein et de la région mammaire* (1853). His last work was the article *Adénite* in the *Dictionnaire encyclopédique des sciences médicales* (1865).

VELVET (Lat. *vellus*, a fleece), a textile fabric woven wholly of silk or of silk and cotton mixed, having a loose pile or short shag of threads on the surface, which give it a fine soft nap. Cotton stuffs manufactured in the same way are commonly called velveteens. This manufacture appears to have originated about the 13th century, and was limited for a long time to the Italian cities. It thence passed into France, where it was greatly improved, and in 1685 was introduced into England by French refugees. Velvet is very durable, from the close texture of the under side, and also from the thick nap of the upper, which opposes great resistance to external friction. It is moreover very warm, and suitable for rich ornamental figured work. Its peculiar character is derived from the insertion of short pieces of silk thread, secured under the shoot, weft, or cross threads, their ends standing upright and so closely together as to conceal the interlacing of the threads beneath. They are furnished in an extra set of threads, called pile threads, arranged in the loom parallel to the warp threads, and much longer than these, which in the progress of the weaving are passed, after every third throw of the shuttle, over a thin, semi-cylindrical, straight brass wire, which is laid across the whole fabric over the warp threads. The next working of the treadle carries the pile threads down over the wire, when they are covered and fastened by the next throw of the shuttle. Another wire is placed in the same position for the next row of loops across the fabric, and these are produced, as already observed, with every third throw of the shuttle. Two wires only are used, and these are freed in turns by the same process which converts the loops into a pile. Each of them has a groove along its upper surface, and on this is run a sharp-edged knife, thus severing the loops and leaving two ends of each one projecting above the fabric. These are brushed up and dressed to produce the velvety nap. If some of the pile threads are left uncut, the velvet is then of the striped kind; and some is used altogether uncut. Fine velvets contain 40 to 50 rows of loops in an inch length of the fabric, and their production is therefore exceedingly slow and laborious. The process is moreover complicated by the use of two shuttles, a stouter thread being used after the wire than the two which succeed. Hence the production of a yard of plain velvet is considered a good day's work.—Various modifications have been introduced in the manufacture of velvet, among which is that of Mr. Gratrix, who produces the pile by the weft, the cut being then made in the direction of the warp. The pile threads are woven over a series of fine longitudinal knives, over the points of which the portions of the weft intended to form the pile slide successively as the cloth is woven; and the weft is severed in passing over the cutting portion of these knives, which are fixed. By some of the new methods the velvet is cut and embossed at the same time.—Lyons is the principal seat of the manufacture of broad velvets, such as those for cloak making called Ponson velvets, and St. Étienne is the principal seat of velvet ribbon manufacture. Trimming velvets of the finest kinds are made by hand in Rhenish Prussia.

VENAISSIN. See COMTAT-VENAISSIN.

VENANGO, a N. W. county of Pennsylvania, drained by the Alleghany river, French creek or Venango river, and Oil, Sugar, and Sandy creeks; area, 850 sq. m.; pop. in 1870, 47,925. A large part of the county is traversed by spurs of the Alleghany mountains. The soil along the streams is fertile. Iron ore and bituminous coal are very abundant, and there are traces of silver mines. Lumber and oil are exported largely. This county forms the centre of the great oil basin of Pennsylvania, and there are hundreds of oil wells in the valleys. (See PETROLEUM.) It is traversed by the Oil Creek and Alleghany River, the Alleghany Valley, the Pithole Valley, and the Franklin divisions of the Lake Shore and Michigan Southern, and of the Atlantic and Great Western railroads. The chief productions in 1870 were 72,158 bushels of wheat, 28,610 of rye, 216,753 of Indian corn, 335,899 of oats, 63,267 of buckwheat, 75,355 of potatoes, 268,405 lbs. of butter, 92,355 of wool, and 27,879 tons of hay. There were 5,113 horses, 6,963 milch cows, 7,412 other cattle, 32,764 sheep, and 10,379 swine; 6 manufactories of boots and shoes, 16 of carriages and wagons, 25 of machinery, 24 of refined petroleum, 10 flour mills, 9 saw mills, and 5 woollen mills. Capital, Franklin.

VENDACE, the name given in Great Britain to a fish of the salmon family and genus *coregonus* (Cuv.). This fish, *C. Willughbii* (Jard.), or *C. albula* (Cuv. and Val.), is 7 to 8 in. long, delicate greenish brown above, shading into silvery below, with the lower fins bluish white; iris silvery, tinged with yellow. The mouth is very small, and without teeth except a few minute ones on the tongue; scales large; first dorsal higher than long; lower jaw the longer. The arches of the gills are furnished on the inner side with numerous long processes barbed on each side and projecting into the cavity of the mouth; those of the two sides meet and form a complete strainer, arresting the small crustaceans on which they feed until enough have been collected to be swallowed, the water at the same time flowing freely over the gills. It is highly esteemed for food, having somewhat the flavor of the smelt; it is caught only in nets; it is in best condition about Aug. 1, when it is fat and well flavored; the food consists chiefly of minute crustaceans.

VENDÉE, La, a W. department of France, formed from the old province of Poitou, bordering on Loire-Inférieure, Maine-et-Loire, Deux-Sèvres, Charente-Inférieure, and the bay of Biscay; area, 2,588 sq. m.; pop. in 1872, 401,446. The surface is level or undulating, and marshy along the coast. The marshy district is known as *le Marais;* the woody tract in the centre of the department as *le Bocage;* and the rest of the country as *la Plaine*, a fertile district watered chiefly by the river Vendée. The navigable streams are the Autise, Vendée, Lay, Vic, Sèvre-Niortaise, and Sèvre-Nantaise. The coasts are low, and there are but two harbors, Sables-d'Olonne and St. Gilles. The chief productions are grain, wine, hemp, flax, wool, cattle, coal, and metals. The manufactures are unimportant. It is divided into the arrondissements of Napoléon-Vendée, Sables-d'Olonne, and Fontenay-le-Comte. Capital, Napoléon-Vendée.—La Vendée is famous for a royalist insurrection after the proclamation of the first republic, which spread over Lower Poitou, Anjou, Lower Maine, and Brittany. The movement was semi-religious, and originated with the peasantry in 1793, under the lead of Jacques Cathelineau. (See CATHELINEAU.) The count Henri du Verger la Rochejaquelein became especially distinguished as leader of the insurgents; but they were signally defeated in December, 1793, and hundreds of them massacred. In the following spring the war broke out again under La Rochejaquelein, Stofflet, and Charette. (See LA ROCHEJAQUELEIN, and CHARETTE.) The first was killed at Nouaillé, March 4, 1794, after a desperate struggle. The Chouans, with whom the Vendeans were afterward united, appeared at the same time N. of the Loire, in the departments of Morbihan and Côtes-du-Nord. (See CHOUANS.) The convention made a peace with the Vendeans early in 1795, guaranteeing to them a general amnesty, freedom of religious worship, exemption from military service, and indemnification for their losses. But the landing of a body of French *émigrés* at Quiberon in June encouraged them to take up arms again. Gen. Hoche was sent against them, and succeeded, after Stofflet and Charette and other chief leaders had been shot (February and March, 1796), in enforcing submission. The cruel punishments of 1793-'4 were not repeated. Far less important insurrectionary movements took place in 1799 and 1800, and during the hundred days (1815), when the marquis Louis du Verger la Rochejaquelein, brother of Henri, the commander of the last Vendean army, was killed, June 4. —See Crétineau-Joly, *Histoire de la Vendée militaire* (4 vols., Paris, 5th ed., 1865).

VENDÔME (anc. *Vindocinum*), a town of France, in the department of Loir-et-Cher, on the Loir, 18 m. N. W. of Blois; pop. in 1872, 9,938. It was formerly capital of the district of Vendômois, which comprised parts of the present departments of Loir-et-Cher and Sarthe. It contains the ruined château of the dukes of Vendôme, a lyceum, a public library, and manufactories of leather, gloves, and cotton goods. Several combats took place in the vicinity previous to and after the German occupation of the city (Dec. 16, 1870).

VENDÔME. I. César, duke de, a French prince, the eldest son of Henry IV. by his mistress Gabrielle d'Estrées, born in the castle of Coucy, Picardy, in June, 1594, died in Paris, Oct. 22, 1665. He was legitimated in his infancy, and in 1598 made duke of Vendôme and betrothed to the daughter of the duke de Mercœur, who resigned to him the government of Brittany. In 1610 he was allowed to take rank next to the princes of the blood. During the reign of his half brother Louis XIII., he participated in the conspiracy of Chalais against Richelieu (1626), was incarcerated for four years at Vincennes and Amboise, and banished for several years afterward. In 1641 he was charged with an attempt to poison Richelieu, and escaped to England. After the death of Richelieu he returned home, and was treated with great favor by the queen regent Anne of Austria; but he lost her good will by his active part in the Fronde. In 1650, having made his peace with the government, he was appointed governor of Burgundy. In 1653 he took Bordeaux from the Frondeurs, and in 1655, in the capacity of grand admiral of France, defeated the Spanish fleet off Barcelona. He left two sons, Louis and François, the latter of whom was the celebrated duke of Beaufort. (See BEAUFORT, FRANÇOIS DE VENDÔME, duke of.) **II. Louis,** duke de, son of the preceding, known as the duke de Mercœur during his father's life, born in 1612, died in Aix, Aug. 6, 1669. He served abroad, returned to France after Richelieu's death, and became in 1649 viceroy and commander of the French troops in Catalonia. He married in 1651 Laura Mancini, a niece of Cardinal Mazarin, was made commander in Provence, and placed in 1656 at the head of the French army in Lombardy. On his wife's death (1657) he became a priest, was made cardinal, and held the office of papal legate in France. **III. Louis Joseph,** duke de, a French general, son of the preceding, born in Paris, July 1, 1654, died at Tiñaroz, Catalonia, June 11, 1712. He was first known as the duke de Penthièvre, entered the army in 1672, distinguished himself in Alsace under Turenne and in Flanders under Créqui, and became governor of Provence in 1681. He distinguished himself at the battles of Steenkirk, Aug. 3, 1692, and Marsaglia, Oct. 4, 1693. In 1694 he became "general of the galleys," and in 1695 chief commander in Catalonia. In 1697 he besieged Barcelona, defeated the Spanish army which attempted to relieve the city, and forced it to surrender, Aug. 10; but in the same year it was restored to Spain in accordance with the treaty of Ryswick. On the breaking out of the war of the Spanish succession, he was, after the capture of Marshal Villeroi in Cremona, placed in command of the French army in Italy, and arrested the progress of Prince Eugene; but he was overtaken by his opponent at Luzzara, August, 1702, and saved himself from a disastrous defeat only by his generalship and intrepidity. After a fruitless attempt to reach Germany through Tyrol, he returned to Piedmont, where he took several strongholds, and defeated Prince Eugene at Cassano (1705), and Reventlow at Calcinato (1706). After the battle of Ramillies he was called to Flanders to command the French army under the grandson of Louis XIV., the duke of Burgundy; hampered in his movements by those who surrounded the young prince, he could not prevent the junction of Marlborough and Eugene, failed to effect a junction with Berwick, and was defeated at Oudenarde (1708). Disgusted with the treatment he received, and feeling that he had lost the confidence of the king and was hated by Mme. de Maintenon, he retired from active service. In 1710 Philip V. of Spain, deserted by Louis XIV., his grandfather, who was now scarcely able to defend himself, asked that Vendôme should be sent to his assistance. The old warrior went at once to Valladolid, gathered crowds of volunteers, inspired the adherents of Philip with new confidence, and brought him back to his capital; then he defeated and captured at Brihuega an English corps under Stanhope, and finally won at Villaviciosa, Dec. 10, 1710, a decisive victory over the Austrian general Stahremberg, which firmly established Philip on his throne. He was completing the conquest of Catalonia when he died suddenly.

VENEDEY, Jakob, a German author, born in Cologne, May 24, 1805, died near Badenweiler, Feb. 8, 1871. He studied at Bonn and Heidelberg, and was employed in his father's law office at Cologne till 1832, when his work on juries and his participation in the Hambach festival caused him to be imprisoned; but he escaped to France, and in 1835 established in Paris a monthly periodical, which resulted in his expulsion, and having returned he was again expelled in 1837. He retired to Havre, and was only permitted to reside in the capital after the appearance in 1840 of one of his works which was favorably received by the French academy, and caused Arago and Mignet to interfere in his behalf. In 1848 he returned to Germany, and became a member of the Frankfort parliament and of the rump parliament at Stuttgart. Subsequently he was expelled from Berlin and Breslau, and resided chiefly at Bonn till 1853, when he became a lecturer at the university of Zürich. In 1855 he returned to Germany. He first published in French, then in German, *Römerthum, Christenthum, Germanenthum* (Frankfort, 1840). His other works include *Irland* (Leipsic, 1844); *England* (1845); *Das südliche Frankreich* (Frankfort, 1846); *Geschichte des deutschen Volks* (4 vols., Berlin, 1854–'62); and biographies of Hampden (1843), Washington (1862), Franklin (1863), and Stein (1868).

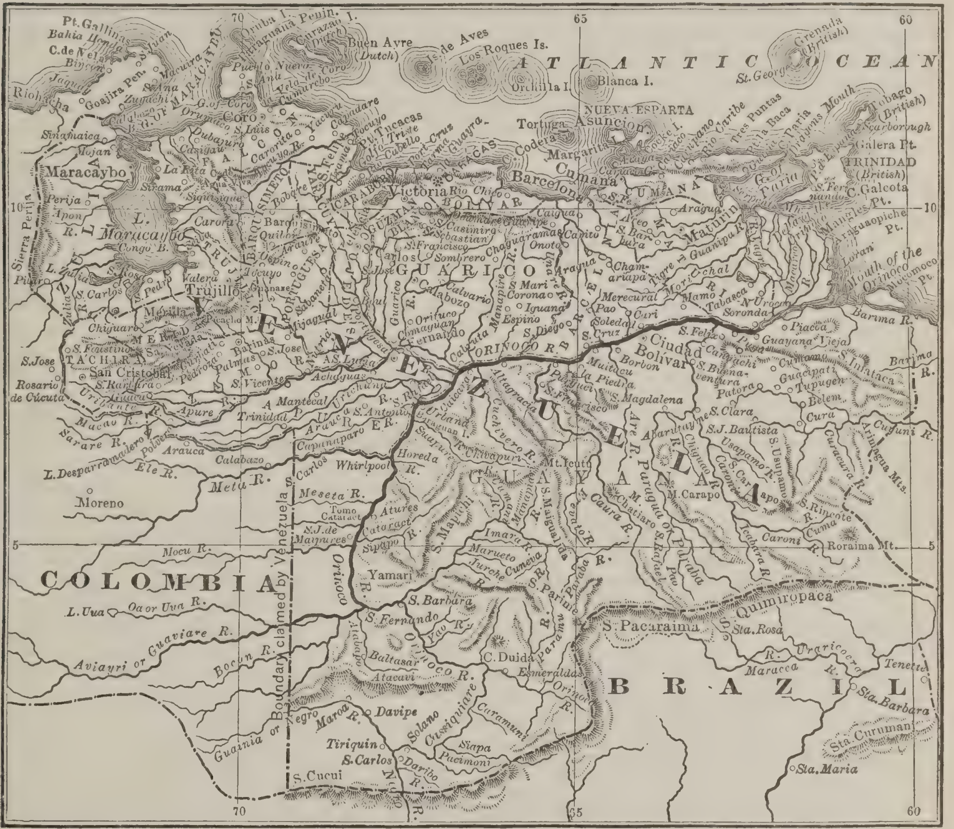
VENEER, a thin sheet of wood or other material used to give an exterior finish to articles of cabinet or other work, the body of which is of cheaper material. The art of veneering is not modern; according to Pliny it was introduced about his time. Veneers were formerly cut with thin hand and pit saws, from blocks of wood. In 1806 Mr. Brunel patented a method of splitting them from straight-grained wood, but curved and knotted wood required to be sawed. Circular saws replaced the old straight saws. Veneer is now sawed by very thin reciprocating gang saws, which work with so much precision as to saw very wide strips as thin as cardboard. The work is done in establishments usually connected with saw mills. The cabinetmaker in applying the veneer roughens one surface, that the glue may hold it firmly to the body of the work. The outer surface of the veneer is afterward dressed with planes and scrapers, and polished with sandpaper and brushes or pumice.—Veneers of ivory and of bone are used for some purposes; and in Paris a pianoforte has been entirely covered with a single sheet of ivory cut in a spiral from an elephant's tusk. The manufacturer advertised to supply such sheets 150 in. long and 30 in. wide. In the United States department of the great exhibition of 1851 there was a veneer of this kind 40 ft. long and 12 in. wide.—The inlaying of thin strips of wood or veneers in wood of other colors has been treated in the article BUHL WORK.—A remarkable variety of veneering has been introduced into the United States, called "pressed work." Any number of veneers are laid together, the grain of each one at right angles to that of the adjacent layers, and all after being well saturated with glue are strongly compressed until the whole is united in one mass. For curved work the pressure is applied upon the mass placed while hot in moulds. By this method the backs of chairs are made in graceful curves and of great strength, the crossing of the grain preventing all danger of splitting. Strong plain wood, as black walnut, may be used for the inner layers, while the outer may be of rosewood or other highly ornamental wood. The tops of tables thus made are not liable to warp, and the method has been successfully applied to the construction of tables for sewing machines. Dished or spheroidal pressed work may be made in any desired curves by cutting the veneers into strips of varying width according to the part of the mould into which they are to be pressed.—Ornamental surface in relief has been given to veneers by pressing them between two moulds or dies, and filling the concavities on the hollow side with mastic or some plastic substance. Before pressing them, the surface to be in relief is smoothed and polished, and paper is pasted over the other. The dampness of the paste favors the adjustment of the wood to the irregularities of the die, from which the veneer is not removed until all moisture has disappeared.

VENETIA, in ancient geography, a district of upper Italy, bounded by the Carnic Alps, the Timavus (now Timavo), the Adriatic, and the Athesis (Adige), which separated it from Cisalpine Gaul proper, of which it sometimes formed part. It was a fertile territory, the principal productions of which were wool, sweet wines, and race horses. The chief cities were Aquileia, Ateste (Este), Patavium (Padua), Vicentia (Vicenza), and Tarvisium (Treviso). The inhabitants, the Veneti or Heneti, were reputed to be descendants of the Paphlagonian Heneti, brought to the shores of the Adriatic by Antenor, a Trojan hero, the legendary founder of Patavium (Padua). Others supposed them to be kindred to the Celtic Veneti in Gallia Lugdunensis; but they not only spoke a different language from that of the Celts, but also lived in continual hostility to the Gallic tribes in their neighborhood. According to Herodotus, the Veneti inhabited Illyria. Modern critics are inclined to regard them as Slavs, of the same branch as the Winds in the neighboring Illyrian provinces of Austria. They early entered into an alliance with Rome, and subsequently became her subjects without resistance. Under the earlier emperors they enjoyed great prosperity, but during the 3d, 4th, and 5th centuries their territory was frequently devastated by the invading barbarians. The invasion of the Huns, under Attila, drove many of them to the islands and lagoons of the Adriatic, where they became the founders of Venice, with whose history that of Venetia became closely connected. The republic gradually absorbed the petty states which had arisen in the early part of the middle ages, and extended its possessions in Italy beyond the limits of the ancient territory. (See VENICE.) In 1815 the country as far W. as the Mincio and S. to the Po was made part of the Lombardo-Venetian kingdom of the Austrian empire, and in 1866 became a territorial division of the kingdom of Italy; it is bounded N. W., N., and N. E. by Tyrol and Carinthia, E. by Görz and Gradisca, S. E. by the gulf of Venice and the Adriatic, S. by the division of Emilia, and S. W. and W. by Lombardy; area, 9,060 sq. m.; pop. in 1872, 2,642,807. It is divided into the provinces of Belluno, Padua, Rovigo, Treviso, Udine, Venice, Verona, and Vicenza. The chief rivers are the Po, Adige, Brenta, and Piave. Lake Garda and the Mincio form part of the western boundary.

VENEZUELA, United States of, a republic of South America, extending from lat. 1° 8′ to 12° 16′ N., and from lon. 60° to 73° 17′ W. It is bounded N. by the Caribbean sea, E. by the Atlantic and by British Guiana, S. by Brazil, from which it is partly separated by the Pacaraima mountains, and W. by the United States of Colombia. Its maximum length from E. to W. is about 900 m., and its maximum breadth from N. to S. 770 m. The area (including the islands), according to the *Almanach de Gotha*, is 403,000 sq. m. Codazzi, in his *Resúmen de la geografía de Venezuela* (1841), set it down at 431,000 sq. m. It is divided into 20 states, 1 federal district, and 1 territory, which, with their population and capitals, are as follows:

STATES, &c.	Pop. in 1873.	CAPITALS.
Apure	18,635	San Fernando.
Barcelona	101,396	Barcelona.
Barquisimeto	143,818	Barquisimeto.
Bolivar	129,143	La Guayra.
Carabobo	117,605	Valencia.
Cojedes	85,678	San Carlos.
Cumaná	55.476	Cumaná.
Falcon or Coro	99.920	Coro.
Guárico	191,000	Calabozo.
Guayana	34,058	Ciudad Bolivar.
Guzman Blanco	94,151	Victoria.
Maturin	47,863	Maturin.
Mérida	67,849	Mérida.
Nueva Esparta (Margarita)	80,983	Asuncion.
Portuguesa	79,934	Guanare.
Táchira	68,619	San Cristóbal.
Trujillo	108,672	Trujillo.
Yaracui	71,689	San Felipe.
Zamora	59,449	Barinas.
Zulia	59,235	Maracaybo.
Distrito Federal	60,010	Carácas.
Territory of Amazonas	23,048	....
Total	1,784,194	

Differences between populations of certain states in the above table and the figures given in the separate articles on such states, different capitals, &c., are attributable to the new territorial division of the republic and the official census of November, 1873, first published in 1875. The populations of some of the chief cities, according to that census, were as follows: Carácas, the capital, 48,897; Valencia, 28,594; Barquisimeto, 25,664; Maracaybo, 21,954; Maturin, 12,944. The white population was estimated at about 1 per cent. of the total, and the foreigners resident in the republic at 10,000. Much the largest part of the population consists of half-breeds and hybrids from the union of Europeans (chiefly the early Spanish colonists) and Indians, and the intermingling of these and negroes. Of pure-blooded Indians Codazzi in 1841 enumerated 49 wild and independent tribes, numbering in all 52,415, of whom 9,000 were Goajiros occupying the eastern half of the Goajira peninsula claimed by Venezuela.—The coast line, from Cape Chichibacoa in the N. E. extremity of the peninsula of Goajira to the boundary line with British Guiana, nearly 2,000 m., following the sinuosities, about one tenth of which is washed by the Atlantic, is notched by numerous gulfs, bays, and inlets. The first deep indentation, beginning at the east, comprises the main mouth of the Orinoco, between Points Mocomoco and Araguapiche, 65 m. apart. About 90 m. W. of the latter point, at the N. W. extremity of the great swampy delta of the Orinoco, is the gulf of Paria, the shores of which are mostly bold and rocky, 100 m. long and 47 m. wide, separated from the Caribbean sea by the peninsula of Paria, and from the Atlantic by the island of Trinidad. The gulf of Cariaco is a narrow inlet, nearly 50 m. long, between the peninsula of Araya and the Cumaná coast, presenting a picturesque and commodious roadstead. From Cumaná westward to Barcelona the coast, though still rocky, becomes gradually lower and more even; and from the latter port to Cape Codera it is low and sandy, and interspersed with extensive salt marshes. Between Cape Codera and the gulf of Triste (formed by a rectangular northward bend of the coast, 25 m. W. of the port of Puerto Cabello) is comprised the most rugged portion of the seaboard, flanked by the Venezuelan coast range of mountains, and notched by a series of inlets fringed with luxuriant vegetation. This strip of coast is 150 m. long. Beyond Point Tucacas, at the N. W. extremity of the gulf of Triste, the shore is again low and sandy, with intervals of mangrove marshes, and occasional low spurs from a branch of the far distant Mérida mountains. From the middle of the Goajira coast to Cape Chichibacoa it presents an uninterrupted perpendicular wall of rock. Enclosed between the Goajira peninsula on the west, the rocky peninsula of Paraguaná on the east, and the main coast on the south, lies the gulf of Maracaybo, or more properly of Venezuela, the largest of the republic, having an area of about 6,500 sq. m. The eastern branch of this gulf, called by native geographers the *golfete de Coro*, has an area of about 1,000 sq. m., and, being completely sheltered from the



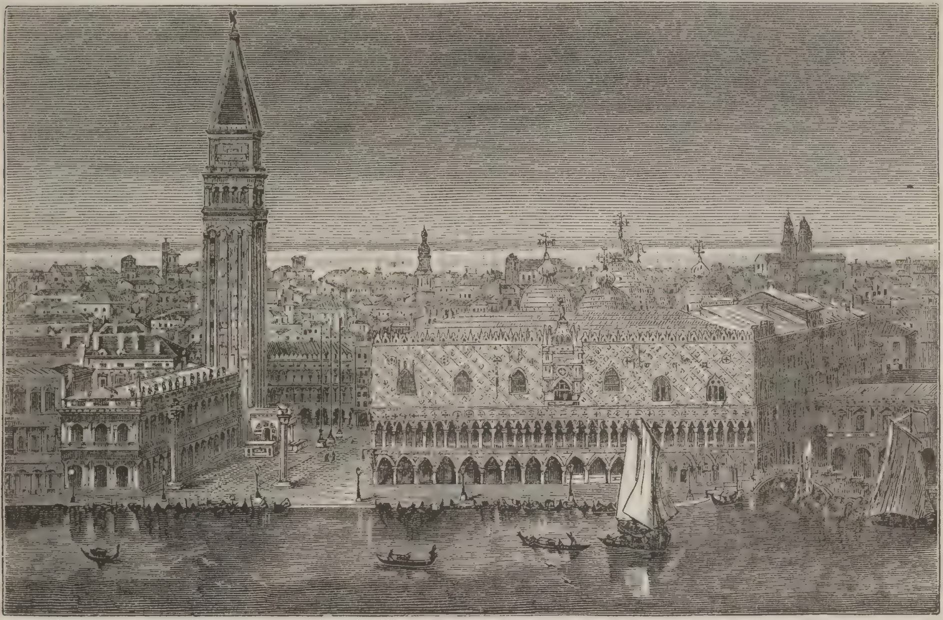
prevailing winds by the Paraguaná peninsula, forms a vast and commodious haven. Of the 32 ports, those of La Guayra and Puerto Cabello are most frequented by foreign shipping. The fortifications of La Guayra have been lately restored, and are to be supplied with a complete armament. Cumaná, at the mouth of the gulf of Cariaco, is well sheltered and defended, as is also the less important port of Barcelona, on the banks and near the mouth of the Neveri. The harbor of Coro, though much exposed, is the seat of an active trade with the West Indies; but this port and that of Maracaybo on the gulf of that name were in 1875 closed to foreign traffic, and vessels to and from them are now entered and cleared at Puerto Cabello. Ciudad Bolivar (formerly Angostura), on the Orinoco, 240 m. from the sea, is the entrepot for the products of all the regions drained by that river and its more important affluents, two of which, the Meta and Apure, are navigated by steam. No fewer than 71 islands fringe the coast, the largest being that of Margarita, which constitutes a state, and all being of volcanic origin except those in the various river mouths and in the outlet of Lake Maracaybo, which are accumulations of mud or sand. The larger islands after Margarita are Chimana, Caraca, and Borracha off the Barcelona coast; Tortuga, further seaward; Orchila or Orchilla, affording large quantities of the dye of that name; the Roques and Aves, west of Orchilla; and Blanca, due N. from Margarita. Nearly all these islands are inhabited by large numbers of goats.—About 107,000 sq. m. of the republic are occupied by mountains, forming two separate systems. The first is a ramification of the Colombian Andes, which bifurcate in the node or knot of Pamplona, lat. 7° 15′ N., lon. 73° W. One branch runs N. to lat. 10° 50′, then curves N. E. and terminates in Cape Chichibacoa at the N. E. extremity of the Goajira peninsula. From Pamplona to the Venezuelan frontier, lat. 9° N., it is called the Sierra de Ocaña; thence to Goajira, Sierra de Perija, a range which nowhere attains a height of 5,000 ft.; and in the peninsula it receives the name of Oca mountains. The last two ranges form the N. W. boundary line with Colombia. The other and principal branch, comprising the great alpine region proper of the republic, trends N. E. to the snowy mountains of Mérida, which, gradually declining toward the Páramo de las Rosas in the hilly districts of Tocuyo and Quibor, sink on the right bank of the Rio Cojedes S. of Barquisimeto. On the opposite bank of that stream the chain again rises abruptly toward Puerto Cabello, whence, under the name of Venezuela Coast chain, it extends like a wall uninterruptedly E. to the promontory of Paria, with a mean elevation of but 4,800 ft.; the two loftiest summits, the Silla de Carácas and the Picacho de Naiguatá, reaching respectively 8,547 ft. and 9,100 ft. This marginal chain is divided into many ranges enclosing numerous fine valleys, as that of Aragua, which yields the indigo and other tropical plants and European wheat in great abundance. The Mérida mountains, with a mean altitude of 6,000 ft., comprise 31 summits exceeding 10,000 ft., the loftiest of which are the two peaks of the Sierra Nevada, 15,066 (the culminating point of Venezuela) and 15,000 ft. The second system is that of the Parima or Parime mountains, extending over the whole southern division of the Orinoco basin, still but little known. To this system belongs the Sierra de Pacaraima, forming a part of the southern boundary of the republic. The other principal ranges, mostly extending N. W. between the Pacaraima chain and the Orinoco, are those of Parima (highest summit, 7,608 ft.), Maraguaca (8,151 ft.), Maigualida, Chuchivero, Guachimacari, Cuneva, Guayapú, Sipapo, Cerbatana, Rinocote, Carapo, Imataca, and Upata. Chief among the isolated peaks is the Duida mountain, between the Sierra de Parima and the upper Orinoco, with an elevation of 8,823 ft. (See DUIDA.)—Upward of 1,000 rivers drain the territory of Venezuela, all but 12 of which have their entire course within its limits. The Orinoco, ranking third among the rivers of South America, has a course of 1,500 m., pours into the ocean by 17 mouths the waters of over 400 navigable tributary streams, and drains a region of 250,000 sq. m. (See ORINOCO.) The Rio Negro, rising in Colombia, flows through the S. W. corner of Venezuela, receiving an extensive tribute from the Orinoco by the Cassiquiare, whereby navigable communication is established between the Orinoco and Amazon. Into the Caribbean sea and the gulfs of Venezuela and Paria flow 230 rivers, the largest of which are the Tuy, Tocuyo, and Unare, and 400 minor streams; and into the lake of Maracaybo about 500, of which only 100 are perennial. Venezuela contains over 200 lakes and lagoons. The most interesting lake is that of Valencia, the Tacarigua of the Indians, bounding the southern margin of the delightful valley of Aragua, and 1,599 ft. above the sea. From excessive evaporation its islands, now 22 in number, continually increase in size, and since the beginning of the present century several sand banks have become true islands, called *aparecidas* (newly appeared). The lake contains several species of fish peculiar to itself. The principal lagoons are those of Maracaybo (called also lake) in the state of Zulia, nearly 100 m. long, with a maximum breadth of 75 m.; Unare, separated from the sea by a sandy tongue of land, where excellent salt is produced; Taiguaiguai, Palmananita, Encantada, Gacasonica, with an outlet to the sea and navigable by schooners, and Lagunillas in Mérida, famous for its *urao* (sesquicarbonate of soda, or the *trona* of commerce). Most of the smaller lagoons become altogether dry in summer.—The geology of Venezuela has been but little studied, save in the portions visited by Humboldt and Schomburgk. The northern branch of the Andes, and the eastern to the banks of the Cojedes, are granitic, while the rocks of the littoral chain are metamorphic; but the surface rocks of Falcon and Zulia belong for the most part to the carboniferous era. Calcareous rock underlies the argillaceous surface stratum of the plains (*llanos*), which, stretching from the southern edge of the plateau of Carácas to Brazil, and from the head waters of the Vichada to British Guiana, were once probably the bed of a vast inland sea. Diamonds have been found in Nueva Esparta, and amethysts in Bolivar. Gold occurs in Bolivar, and especially in Guayana, where some mines are still worked, and in the sands of many of the rivers discharging into the Caribbean sea; platinum in Bolivar; silver in Yaracui, Barquisimeto, Barcelona, Mérida, Trujillo, and Bolivar; copper in large quantities in the littoral chain, and particularly in Bolivar, though the once productive mines have been abandoned; and tin, zinc, lead, quicksilver, and antimony in various parts of the country. Iron is reputed abundant in Bolivar, Falcon, Nueva Esparta, and Barcelona; but owing to lack of skill in the art of mining and the prevalence of civil wars, no mines have been worked. Alum, sulphate of magnesia, gypsum, and saltpetre abound; there are several varieties of marble; salt is extensively produced in various parts of the coast; phosphate of lime is extracted from the largest island of the Roque archipelago; and sulphur might easily be made available in extensive quantities in Barcelona, Falcon, and Mérida. Asphaltum and petroleum are said to be plentiful in the littoral states from Cumaná to Zulia, and coal beds occur in Falcon. From the lagoon of Lagunilla in Mérida are extracted considerable quantities of *urao*. Among the numerous thermal springs are those of Las Trincheras near Valencia, of Onoto, and of Mariara, the temperatures of which are 210°, 112°, and 149° F. respectively; but the most remarkable are those of the Quiva, in the vicinity of Coro, where two large white semispheroids contain in some 40 cavities many-colored waters at temperatures varying from 40° to 152° F.—Venezuela, in common with all the mountainous countries of Spanish America, presents three grand divisions as to climate: the *tierras cálidas* (hot lands), *tierras templadas* (temperate lands), and the *tierras frias* (cold lands). In the first region, extending to 2,000 ft. above the sea, the mean annual temperature for the whole republic is 80° F.; but in many portions a much higher temperature prevails, as in La Guayra, where it ranges from 100° to 110° F.; in Barcelona, whose capital Humboldt notes as one of the hottest and most insalubrious places on the globe; and in Maracaybo, by far the hottest locality in the country. In the temperate region, mostly confined to the *mesas* or plateaus from 2,000 to 7,000 ft. above the sea, in the mountains designated as the second branch of the first system, and in the coast chain, the thermometer fluctuates between 65° and 75°. The climate of this region, the most populous of Venezuela, is one of perpetual spring and remarkably salubrious. To the third or cold region belongs all above 7,000 ft., including the bleak, chilly, and inhospitable *páramos* or highest table lands. A remarkable fact, hitherto unaccounted for, is the uninhabitableness of the Venezuelan table lands above 8,000 ft., notwithstanding their proximity to the equator, while those of Mexico (some over 8,000 ft.), Quito, Bogotá, Cuzco, and Oruro (the last over 13,000 ft.) are among the most delightful regions of the earth. There are here, as elsewhere in tropical America, but two seasons, the dry and the rainy. The former, called summer, usually lasts from November to April; winter extends over the remaining months, save in Guayana, where, owing to the dense forests, the rains are more persistent than in the other states. The mean annual rainfall at Carácas is about 330 inches in 80 days. Yellow and intermittent fevers are common throughout almost the whole of the coast region during winter, and elephantiasis and goitre are the great scourges of the plateaus. The prevailing winds on the coast during summer, and especially in December and January, are those from the north and northeast. Earthquakes are frequent, and often very disastrous, as that of February, 1610, which destroyed several towns in Táchira and Mérida; that of October, 1766, which laid Cumaná in ruins; and that of March 26, 1812, the most terrible of all, which completely ruined the city of Carácas, then numbering 50,000 inhabitants.—The soil, except in the sandy regions of the coast and the lofty and arid *páramos*, is for the most part exceedingly fertile. The region below the level of 3,000 ft. is the country of the palms, here inferior only in variety to those of the Brazilian forests. Most noteworthy among them are the sago palm, which thrives in the low lands; the *chiquichique* and the *yagua*, whose fibrous tufts are converted into cordage, while the yagua yields also an excellent oil; the *chaguarama*, furnishing material for thatch and laths; and the giant royal palm, the wax palm, and several other species. The cocoa palm is, after the common fan palm, the most abundant, and cocoanut oil is exported in considerable quantities. Mention should likewise be made of the breadfruit tree and peach palm, esteemed for their farinaceous fruits. The woods of the central valleys and the immense forests of Guayana offer a great variety of timber and cabinet woods, including mahogany, rosewood, satinwood, black and white ebony, &c. The *bejuco mavacure*, from the juice of which the Indians prepare their famous arrow poison *curare* or woorara, is common in Guayana. The true cinchona forms whole forests at elevations varying from 2,700 to 4,500 ft. above the sea. The *caucho* or India-rubber tree is abundant, as are also Brazil and other dye woods and plants, including the celebrated dividivi, gums, resins, spices, and medicinal plants and herbs. The principal cultivated products and the number of acres devoted to each in 1873 are as follows:

PRODUCTS.	Acres.	PRODUCTS.	Acres.
Cacao	51,490	Wheat	9,282½
Coffee	304,725	Cocoa	1,837½
Tobacco	9,752½	Plantains	68,510
Cotton	15,000	Various grains and pulse	65,475
Indigo	1,487½	Fruits	21,000
Sugar cane	87,000		
Yuca	25,000		
Maize	37,957½	Total	698,217½

From these figures it appears that only about $\frac{1}{368}$ of the area of the republic, or 1,094 sq. m., is cultivated, while the whole cultivable region is said to embrace an area of 105,084 sq. m. The coffee shrub was introduced into Venezuela in 1784, and it thrives well at elevations between 650 and 5,500 ft. The chief cacao plantations are along the coast from Guiria (Cumaná) to the mouth of the Tocuyo. Indigo culture, once very extensive, has been gradually giving place to that of other staples for 30 years; the product in 1841 was 552,781 lbs., and in 1873 only 182,956 lbs. But little sugar is now exported, though it is largely produced; of 90,690,817 lbs. manufactured in 1873, only 4,997,465 lbs. was shipped to foreign ports. Cotton is sown in May and June, and flowers in November. The plantain is a staple article of food for a large portion of the inhabitants; as is also maize, which is largely cultivated in the lowlands. Tobacco is extensively grown for export, that of Barinas being especially esteemed in Europe.—Wild animals are very numerous. The principal quadrupeds are the jaguar, panther, tiger cat, tapir, a species of black bear, fox, peccary, deer, badger, and ferret. Venezuela has 14 varieties of monkeys, one of them, the *titi*, being in some districts not over 6 in. in length. The rodents include squirrels, rats and mice, porcupines, rabbits, and agoutis. Among the amphibious quadrupeds are the otter, capybara, and *chigüire.* Sloths, armadillos, and two species of anteaters are the principal edentates. The cetaceans are represented by the manatee, *touinas* (a kind of large dolphin), cachalot, and sword fish, the two first abounding in the large rivers. The principal reptiles are the cayman and the *baba*, a smaller species of the same genus; the iguana, basilisk, and chameleon; the boa, attaining at times a length of 50 ft.; the *traga venados* (deer swallower); and 15 varieties of snakes, 10 of which, especially the rattlesnake and *macaurel*, are venomous. Myriads of noxious insects infest all parts of the lowland; and gigantic spiders and centipedes more than 12 in. long, whose sting, in common with that of the yellow scorpion (likewise very numerous here), produces terrible fevers. Enormous bats commit great ravages among the cattle, sucking their blood, and attacking even man himself during his sleep. Excellent fish abound in the lakes and rivers and along the coasts, especially the *liza*, found in the channel separating the island of Margarita from the mainland, and salted and dried for export and for the interior. Margarita was formerly celebrated for its pearl fishery, which is still continued, but much reduced in value. There are two kinds of vultures, three of hawks, and two of owls; partridges and pigeons are plentiful; there are 14 different species of waders and 10 of divers; the Venezuelan parrots yield only in variety to those of Brazil; and the exquisite plumage of the small birds, conspicuous among which are trogons, tanagers, and toucans, is unsurpassed in the world. All the European barnyard fowls thrive well in the temperate region. Vast herds of horned cattle, sheep, horses, mules, asses, and swine roam in a wild state over the plains, whence they take refuge in the elevated districts during the rainy season. The number and value of the live stock in the whole republic in 1873 were returned as follows: horned cattle, 1,389,802, value $22,236,832; sheep and goats, 1,128,273, value $1,692,409; horses, 93,800, value $4,690,000; mules, 47,200, value $1,888,000; asses, 281,000, value $1,686,000; and swine, 362,597, value $2,175,042; total value, $34,368,282.—The Venezuelans in general are intelligent and courteous. Though all enjoy equal civil rights, without respect of caste or color, the whites retain the power of the state in their own hands; while the mixed races, though more indolent and apathetic, are given to turbulence, and are commonly the instigators of factious quarrels and revolutions. The chief industries are agriculture and cattle rearing. Continued internecine strife until lately, and lack of adequate implements and of suitable means of transport to the coast, have materially retarded development; but much has been done since 1873 by Gen. Guzman Blanco's government toward building roads and extending the navigation by steam of the great rivers, lagoons, and lakes of the country. The manufactures include cotton fabrics both by hand and machinery, hammocks, hats, cordage, &c.; in Mérida, woollen carpets, tastefully variegated with brilliant colored flowers from a native dye, are extensively made; ship building is carried on in Puerto Cabello; numerous brick yards are found in different parts of the republic; and several thousand persons are employed in manufacturing cigars and cigarettes, exquisite preserves and sweetmeats, and cacao. Several kinds of oil are made, especially cocoanut, sesame, and *tártago* oils; and perfumes and essences from magnificent and fragrant flowers are extracted in large quantities. There are also a few cart and carriage factories. The foreign commerce is now likely to increase rapidly with the preparation of new and much needed roads, and the extension of steam traffic on the lakes and rivers, and above all with the inauguration of an era of peace. Among exports coffee still holds the first rank, that of Maracaybo and La Guayra being in good demand in the European and American markets. The other principal articles of export are cotton, cacao, sugar, indigo, tobacco, salt, hides, cattle, tallow, horns, sarsaparilla, and dye and cabinet woods. The imports include cotton, linen, and silk goods, flour, provisions, hardware, wines, and specie. The total value of the exports in the year 1872–'3 was $21,320,495, and of the imports $11,264,976. The articles exported and the quantities in 1872–'3 were as follows: coffee, 23,998,585 lbs.; cotton, 5,648,323 lbs.; indigo, 182,976 lbs.; sugar, 5,017,469 lbs.; cacao, 7,573,586 lbs.; tobacco, 1,100,297 lbs.; hides, 130,000; skins (deer and goat), 150,000; cattle, 6,831 head. The total value of the exports to the United States (port of New York) in the years ending June 30, 1870 and 1875, respectively, was $1,897,800 and $4,206,264; of the imports from New York in the same years, $1,122,195 and $1,980,775. The exports to the United States have thus increased by more than 100 per cent. in five years. The articles shipped to that destination are usually coffee, cacao, cotton, indigo, hides, skins, woods, and drugs. The shipping movements for the port of La Guayra in 1872–'3 were: entered, 177 vessels, tonnage 93,424; cleared, 128 vessels, tonnage 131,110. For the port of Puerto Cabello in 1874 they were: entered, 212 vessels, tonnage 105,046; cleared, 126 vessels, tonnage 78,227. The number of vessels entered at all the ports of the republic in 1874 was 2,200. In the year ending June 30, 1875, Venezuelan ports were visited by 17 steamers and 41 sailing vessels from New York, of 21,546 tons. The principal Caribbean ports are now visited monthly by the steamers of one American and seven European lines. The coasting trade, which is considerable, is carried on by national craft only, as are also the fisheries. The traffic between Carácas and its port La Guayra is conducted by means of road locomotives of recent introduction. Telegraphs have been established between Carácas and La Guayra, Coro, and other coast towns; and in February, 1876, materials were shipped from New York for several other lines.—By the terms of the constitution of March 28, 1864, Venezuela became a federal republic closely modelled after that of the United States. The executive power is vested in a president elected for four years, aided by the six ministers of interior and justice, foreign affairs, finance, public works, war and the navy, and public credit. The president has no veto power. The legislative power resides in a congress composed of a senate and a house of representatives, whose members are deputed from the corresponding houses in the individual states. The central judicial power is confided to the supreme court, three superior courts, and the courts of first instance, of which there is one for each canton. The municipal government is conducted by the council of each canton. The constitution in its other provisions resembles that of the United States of America; but its modifications and amendments have of late been too frequent and too numerous for mention here. The army was said, in the president's message of February, 1875, to be 30,000 strong; but a subsequent official publication gave it at 10,000 infantry and artillery, and 78,000 militia. The national revenue amounted in 1873–'4 to $5,570,401, of which $4,565,857 proceeded from the customs and from public storage and tonnage dues; and the expenditures amounted to $5,209,351, although three fifths of the income was to have been appropriated to defraying the expenses of the government, and the remainder to be applied on the amortization of the national debts. On June 30, 1873, the home debt amounted to $16,439,383, and the foreign debt to $46,575,337. The government has recently resumed payment of the interest on these debts, after a suspension of several years.—Education, which has ever been more advanced in Venezuela than in the sister republics, though only in the higher branches, has become the object of most zealous care on the part of Guzman Blanco's administration, under whose auspices primary instruction, gratuitous and compulsory, has been decreed, and primary schools have begun to multiply rapidly. The university of Carácas had in 1874 19 professors and 165 students; and there are besides in that city a medical faculty and a school of arts founded by Guzman Blanco in May, 1870. Elsewhere in the republic there are national and private colleges, and a seminary (called university since the abolition of the seminaries by decree of September, 1872). A semi-official report published in 1875 set down the number of primary schools for the whole republic at 541, of which 141 were federal and the remainder municipal and private schools; the attendance at the former was 7,064, and at the latter 11,017. The religion of the people is the Roman Catholic, but all others are tolerated. The clergy are strictly subordinate to the civil power; the government exercises the patronage of the church, and the papal sanction, when required, is transmitted through it. The archiepiscopal see is at Carácas, and there are two bishoprics, one at Mérida and the other at Ciudad Bolivar.—The island of Margarita and the E. part of the coast of Venezuela were discovered by Columbus in 1498, and the whole coast by Ojeda and Vespucci in 1499. On entering Lake Maracaybo, they found an Indian village constructed on piles over the water (a common occurrence in those portions of the country liable to inundation), and thence called it Venezuela (Little Venice). This name, originally applied only to the region near the lake, was eventually extended to the whole country. The Spanish conquerors at first gave it the name of Costa Firme, and included under this name New Granada and Ecuador also; at the present day only the E. coast of Venezuela is known as Costa Firme. The first settlement was made about 1520, at Cumaná, which is consequently one of the oldest cities in the new world. Coro was founded in 1527. About 1540 indications of gold were discovered at several points along the coast range, and in 1545 Tocuyo was founded, Barquisimeto in 1552, Valencia in 1555, and Carácas in 1567. The demand for cacao, which was largely produced in the Dutch settlement at Curaçoa, led to the formation in 1700 of the Guipúzcoa company in Spain, which sent out emigrants to cultivate cacao and indigo. This company was dissolved in 1778. When Napoleon in 1808 made his brother Joseph king of Spain, Venezuela was among the first of the Spanish colonies to declare for the ancient dynasty; but as early as April 19, 1810, a revolutionary rising took place in Carácas, and on July 5, 1811, Venezuela proclaimed its independence. In 1812, by the treaty of Victoria, it returned to the sway of Spain; but in 1813 it again revolted under Gen. Bolivar, and, after a protracted conflict with varying success, the republic of Colombia, embracing New Granada, Venezuela, and Ecuador, was declared independent in 1819. (See Bolivar y Ponte.) The contest with Spain did not entirely cease till 1823, though the Spanish force had been for some time confined to a small territory. In 1821 a congress was called, and a constitution adopted for the new republic. In 1829–'30 the three states separated amicably, and a new constitution was adopted by Venezuela. For 15 years the presidency was held successively by Gen. Paez (see Paez, José Antonio), Dr. Vargas, and Gen. Soublette. From the accession of Gen. José Tadeo Monagas to the executive power, in March, 1846, until that of Gen. Falcon, in June, 1863, the country was never free from civil war. Falcon, after several years of tranquil possession of power, was deposed by a revolution in which Antonio Guzman Blanco took an active part, and which only terminated on the seizure of the reins of government by the latter on April 26, 1869, after a protracted war with varied success. Guzman Blanco now proclaimed a provisional government and himself the head thereof, with the title of "general-in-chief of the constitutional army of the confederation." He next exacted, from a congress convoked by himself at Valencia, in July, 1870, extraordinary powers, and the title of "provisional president of the republic." He was ultimately elected on Feb. 20, 1873, for four years. Guzman Blanco's administration, though republican in form, is dictatorial in fact, the president exercising supreme authority. Yet no abuses have been complained of, and the country is in a more prosperous condition than it ever had enjoyed since the colonial times. In the course of 1874 and 1875 a sum of $4,260,858 62 was disbursed for municipal improvements and highways. The claims of the United States, upward of $450,000, for materials furnished at the time of the war for Colombian independence, and indemnities for damage sustained by American citizens, are in course of liquidation (1876).

VENI. See Beni.

VENICE (It. *Venezia*). **I.** A province of Italy, in Venetia, bordering on the Adriatic and the provinces of Udine, Treviso, Padua, and Rovigo; area, 850 sq. m.; pop. in 1872, 337,538. The lagoons occupy half of the territory, but the tongue of land extending over 20 m. between them and the sea, and some of the islands, have fertile spots, where agriculture is improving. The principal rivers are the Adige, Brenta, and Piave. It is divided into the districts of Chioggia, Dolo, Mestre, Mirano, Portogruaro, San Dona, and Venice. **II.** A city, capital of the province, on the gulf of Venice, as the N. W. part of the Adriatic is called, in lat. 45° 26′ N. and lon. 12° 20′ E., 155 m. E. of Milan, and 250 m. N. by W. of Rome; pop. in 1872, 128,094. It stands in the midst of lagoons, collectively known as the lagoon of Venice, originally formed by the retreating of the sea. At Venice they are separated from the sea by a tongue of land (*lido*), extending at a distance of about 4 m. from the coast, and divided by gaps or cuttings, some of which form harbors (*porti*), and enclose numerous small islands into which piles were driven for the construction of the city. There are more than 100 canals, provided with small quays, and communication is further kept up by small streets, lanes, alleys, and courts, which with few exceptions are ill paved and overcrowded, and by about 400 bridges, generally steep but with easy steps. A viaduct 2 m. long, with over 200 arches, connects Venice with the principal railways at the Mestre junction. The two broadest canals, Della Giudecca and San Marco, divide the city proper from the island and suburb of Giudecca and from the island of San Giorgio. The so-called great canal (*canalazzo*) divides the city proper into two parts, and is spanned by two iron bridges erected in 1854 and 1858, and by the Rialto bridge, built of marble by Antonio da Ponte in 1588–'91, and called after the largest island (isola del Rialto, from *il rivo alto*, the deep stream). The canals are protected by batteries on both sides, and connected with Malamocco, Chioggia, and other harbors, and with the mainland, the former harbor (porto di Malamocco) being the deepest of all, and enabling large ships to come up to the city. The great canal is lined with magnificent buildings at the water's edge, from which there is immediate access to gondolas, of which there are more than 4,000, all painted black, in accordance with an old regulation. The circumference of the city is about 8 m. It seems from every direction to be floating on water, and presents a unique appearance of fairy-like picturesqueness. The finest and most animated part is St. Mark's place, about 575 ft. long and 185 to 270 ft. broad, containing the cathedral and the doge's palace, bordered by arcades, and surrounded by stately edifices. The Piazzetta or smaller square at the end of St. Mark's place extends to the principal quay (*molo*). At each end of the Rialto bridge are also open spaces, and on the top of the bridge are three busy passages, divided by rows of shops. But the only street worthy of the name is the Merceria, the great commercial thoroughfare, which is connected with the Rialto by intricate and overcrowded lanes.—Of the churches, the most important is St. Mark's, on the E. side of the square, which was formerly the ducal chapel, but is now superseded by San Pietro di Castello as the cathedral. The foundations of the present edifice were laid in 977. It is built chiefly in the Byzantine style, in the form of a Greek cross with the addition of large porticoes. Venetian vessels were obliged to bring from the East pillars and marbles for the edifice, the principal front of which has 500 columns of various shapes and colors. Over the central portal of the vestibule stand the celebrated bronze horses, brought from the hippodrome of Constantinople when that city was taken by the crusaders; they were carried to Paris by Napoleon, but restored in 1815. The cathedral is surmounted by five domes, the central one 90 and the others 80 ft. high. The interior is rather sombre, owing to the limited number of windows, but it is exceedingly rich, the walls and columns being of precious marbles, the pavement of tessellated marble, and the vaulting of mosaics upon a gold ground. Near the angle of the squares is the *campanile* or bell tower of St. Mark, where Galileo made many observations. It is a quadrangular mass of brick, 323 ft. high and 42 ft. square at the base, with a pyramidal pinnacle. There are altogether about 100 churches, and several synagogues. Santi Giovanni e Paolo, popularly called San Zanipolo, contains the monuments of many doges and other illustrious persons. Titian's "St. Peter Martyr," one of its greatest ornaments, was destroyed by fire in 1807. The Franciscan church (Sta. Maria Gloriosa de' Frari) contains the ancient archives and monuments of Titian and Canova. Sta. Maria della Salute possesses Titian's "Descent of the Holy Spirit," and since 1820 the remains of Sansovino. Il Redentore, on the Giudecca island, is regarded as Palladio's masterpiece. San Salvatore, near the Rialto bridge, possesses Titian's "Transfiguration," and splendid monuments by Sansovino, one of the chief architects of the building. Among other noteworthy churches are S. Giorgio Maggiore, S. Zaccaria, SS. Apostoli, S. Francesco della Vigna, S. Giorgio de' Greci, S. Jacopo di Rialto, Sta. Lucia, La Madonna dell' Orto, S. Casiano, de' Gesuiti (with the tomb of Manin, the last doge), S. Giobbe, Sta. Maria della Salute, S. Moise, and S. Stefano, the last being one of the finest in the pointed style. The adjacent island of San Lazaro has been since 1715 the principal seat of the Mekhitarist congregation of Armenian monks, established there by their founder; they are celebrated for editing Armenian works, and for generally promoting Armenian and European literature. (See MEKHITAR.) The doge's palace, built early in the 9th century, has been repeatedly destroyed, generally by fire. In the 14th century it was rebuilt by Marino Falieri. The present edifice dates from subsequent periods. It contains the magnificent hall of the great council, now used as offices of provincial authorities,



St. Mark's Place.

that of the four gates by Palladio, and that of the formidable council of ten, and other memorable rooms, with embellishments and works of art by the most illustrious masters. In the two lower stories are the cells described in the notes to the fourth canto of Byron's "Childe Harold," and at the top of the palace (*sotto piombi*, under the leads), exposed to scorching heat in summer and to cold in winter, languished for a long time political and other prisoners amid excruciating sufferings. Silvio Pellico was one of the last confined here. The famous bridge of sighs (*ponte dei sospiri*) connects the palace with the *carceri* (public prison), built in 1589 by Da Ponte. The original palace of the great judicial dignitaries of the republic, standing upon 50 arches and filling nearly the whole N. side of St. Mark's square, was converted into a royal palace by Eugène de Beauharnais; and one of Sansovino's grandest structures, the church of San Geminiano, was pulled down in 1810 for its extension. Pecht's *Kunstschätze Venedigs* (Trieste, 1858) contains engravings of all the masterpieces in the churches and palaces of Venice. Several of the palaces have been appropriated to various purposes, such as the Farcetti for the municipality and the Grimani for the post office. The latter is the finest modern palace, and the palazzo Vendramin Calerghi was regarded as the most superb in the 16th century. The modernized Manfrini palace once contained a picture gallery far superior to the present one. The *casa d'oro* was an oriental gilded palace of the 15th century, and was restored by Taglioni. The mint and custom house are notable public buildings, but the most impressive of all is the arsenal and dockyard, at the E. end of the city. It was long the most characteristic monument of the great naval power of the republic of Venice. Here are docks and basins, founderies for cannon, forges, an armory, a long ropewalk, and other works. New graving docks and a patent slip are nearly finished. The whole is surrounded by a lofty wall, extends over a circumference of nearly 3 m., and at one time employed 16,000 workmen. At the gate or land entrance are the marble lions brought from Greece at the end of the 17th century. The vessel (Bucentoro) which was annually used in the doge's so-called marriage with the Adriatic by throwing a ring into the sea, was destroyed by the French at the end of the 18th century, together with other relics in the model room. Adjoining the cathedral is a lofty tower (*torre dell' orologio*) with a remarkable clock, above the dial of which are two bronze figures popularly known as "Moors," striking the hours on a bell. At the S. end of the Piazzetta are two granite columns, which were surmounted by the winged lion of St. Mark, the emblem of the republic, and St. Theodore standing on a crocodile and bearing a shield and a sword. Among recent monuments are those of Daniele Manin and Goldoni, and one of Byron is projected.—Venice formerly possessed many *scuole*, lay charitable societies under ecclesiastical patronage; the principal one, that of St. Mark's, now forms part of the great city hospital. The educational institutions comprise, besides the new common schools, a naval college, a lyceum, several gymnasiums, new scientific and polytechnic government schools, and a chair for instruction in Japanese; and there are a museum of the natural sciences, an Athenæum, and a botanic garden. The library of St. Mark's is now in the doge's palace, and that endowed by Petrarch is in the royal palace. The academy of fine arts, in the former convent de la Carità and designed by Palladio, includes several schools and one of the largest and finest picture galleries in Italy. The municipal museum, founded by Count Correr, has also various works of art; and the pinacoteca Manfredini is in the ecclesiastical seminary connected with the church of Sta. Maria della Salute. Venice abounds with memories of Marco Polo, Petrarch, Titian, Tintoretto, and other illustrious men. The principal theatre is La Fenice, accommodating 3,000 persons. It was originally built in 1791, and rebuilt after the fire of 1836, and is now one of the finest opera houses in Italy.—Venice has always been celebrated for its glass pearls, beads, and other glass wares, made in the city and on the island of Murano. The ancient manufacture of brocade tapestry has recently been revived, and also that of the lace work, for which the adjacent island of Burano was always celebrated; and a new feature of industry is the imitations of antique furniture, made of pear wood and bone instead of the ebony and ivory formerly used. Among other manufactures are machines, iron and bronze work, gold and silver ware, optical instruments, photographs, and mosaics. The imports in 1873 amounted to $54,086,843, which was $30,685,926 more than in 1872; the increase was mainly due to that in the trade with India through the Peninsular and Oriental steamers, of which Venice has become an important station. They consisted chiefly of oils, grain, colonial goods and drugs, woven goods and twist, indigo, wine and spirits, silkworm eggs, hardware, timber, hides and leather, and cattle. The exports, valued at $46,999,712, comprised chiefly cotton, butter, grain, raw silk, colonial goods and drugs, textile fabrics and twist, glass beads and enamels, and hemp. The greater part of the trade is with England, Austria, the East Indies, and Japan; next in order of importance are the Turkish empire (including Egypt and Roumania), Holland, Sweden and Norway, and the United States. Venice is the principal market of the petroleum trade with this country, and the imports of that article in 1873 amounted to $704,262. The exports to the United States amounted in the year ending Sept. 30, 1874, to only $56,238 in gold. For the year ending Dec. 31, 1873, the arrivals comprised 439 steamers (203 Austrian, 141

English, 92 Italian, and 3 Dutch), tonnage 275,236, and 2,205 sailing vessels, tonnage 190,158; the departures were 440 steamers, tonnage 276,966, and 2,232 sailing vessels, tonnage 197,567. Venice was a free port for a considerable period prior to Jan. 1, 1874. The unfavorable results anticipated from the change have been in a great measure warded off by the general increase of prosperity owing to agricultural improvements in the interior, to the revival of old branches of industry, and to the greater transit and direct traffic with Egypt, India, China, and Japan, and other countries.—In the early part of the 5th century the Roman territory of Venetia (see VENETIA) was inhabited by a peaceful, prosperous, and commercial people. Aquileia, its capital, was one of the most flourishing cities of Italy, and it contained others which almost rivalled the capital. In 452 Attila invaded the country, burned its towns, massacred many of the inhabitants, and utterly destroyed Aquileia, which was rebuilt at a later period. (See AQUILEIA.) The fugitives from the cities settled on the islands in the lagoons and the gulf of Venice, and, together with the few earlier settlers, supported themselves by fishing and the manufacture of salt. Though professing allegiance to the western empire, they were practically independent, and were governed at first by three consuls elected by themselves. About 457 tribunes elected in the same manner were substituted for the consuls, a change more nominal than real, and the number of these was gradually increased to twelve. The islands, safe from outward attack, were frequently involved in quarrels with each other, until in 697 Cristoforo, patriarch of the island of Grado, proposed that in place of the twelve tribunes one common ruler should be elected for life with the title of duke (in the Venetian dialect *doge*), in whom all power should be vested. In March, 697, Paolo Luca Anafesto was chosen first doge. The families of the twelve deposed tribunes constituted a kind of aristocracy, and subsequently became such by law. The successive changes in the government of Venice, which ultimately degenerated into a terrible oligarchical rule, are noticed in the article DOGE. The seat of government, after being repeatedly changed from one island to another, was permanently fixed in 810 on the island of Rialto, which became a celebrated centre of trade, and it was speedily connected with adjacent islands by wooden bridges. After the fall of the western empire Venice at different times acknowledged allegiance to the Gothic kings, the eastern empire, and the emperors of Germany, but virtually she was independent. In 829, according to tradition, the bones of the apostle St. Mark were transferred from Alexandria to Venice, and he became the patron saint of the republic, which was often styled the "republic of St. Mark." The influx of pilgrims to the shrine of the saint added to the wealth of the city; her commerce increased, and from this time until the beginning of the 16th century she continued to grow in population, wealth, and refinement. Previous to the first crusade in the latter part of the 11th century she had, by conquest, by voluntary submission, or by cession from the eastern empire, acquired territory on the mainland of Italy and in Dalmatia, Croatia, and Istria, on the opposite shores of the Adriatic, and had established commercial relations with the principal nations. Throughout a great part of the eastern empire her traders were exempted from all duties and imposts, and most of the carrying trade of the world was in her hands. In 1098 she sent a great fleet to the assistance of Godfrey of Bouillon; but it contributed more to the extension of her trade and the securing of commercial privileges in the East than to the rescue of the holy sepulchre. She joined the Lombard league against the German emperor, and in 1177 gained a great victory in defence of Pope Alexander III. over the fleet headed by Otho, son of Frederick Barbarossa. In gratitude for this victory the pope gave the doge Ziani a ring and instituted the ceremony of "marrying the Adriatic." Frederick was forced to consent to a congress at Venice, at which peace was concluded. In 1202 the soldiers of the fourth crusade assembled at Venice. Unable to pay in money for their transportation to the East, they consented to assist the Venetians in suppressing an insurrection in Dalmatia, and then under the lead of the doge Enrico Dandolo stormed Constantinople, to avenge Venice for the deprivation of some of her commercial privileges. (See DANDOLO.) The fairest portion of the eastern empire, including parts of the Peloponnesus, Crete, Eubœa, and other islands, now fell under the sway of Venice, and she was the most splendid city in Europe. The spoils and the trade of the East enriched the city, and especially the nobility, who erected magnificent palaces filled with the choicest works of art. In 1289 the inquisition was established, but it was always kept in subjection to the civil power. After some minor conflicts with Genoa, a serious war broke out on the occupation of Constantinople by the Palæologi with Genoese aid (1261); and until near the end of the 14th century the two republics were often engaged in desperate struggles, and Venice was once brought to the verge of ruin. (See GENOA.) Among the internal convulsions during this period, the conspiracy and execution of the doge Marino Falieri in 1355 is chiefly remarkable. (See FALIERI.) But Venice soon recovered from her losses, and on the death of the doge Tommaso Mocenigo in 1423 she had reached the climax of her prosperity. During the period of her struggles with Genoa, she had made herself mistress of Treviso and other territories on the Italian mainland, and after the peace of 1381 also of Vicenza, Verona, and Padua. Under Mocenigo's successor Francesco Foscari (see Foscari) she was engaged for about 30 years in mostly successful wars with the dukes of Milan, and for the remainder of the century with the Turks, with whom a disadvantageous peace was concluded in 1503. During the 16th and 17th centuries Venice was continually at war. Alliances were formed and dissolved at short intervals, so that from the formation of the league of Cambrai against Venice in 1508, between the pope, the emperor of Germany, and the kings of Aragon and France, till the conclusion of the peace of Carlovitz in 1699 between the Turks and the Christians, Venice was at different times engaged in war both for and against nearly every power in Europe. A portion of her Grecian possessions were taken by the Turks in a war which ended in 1540, and Candia, after a long struggle, in 1669; and in 1715 her last hold on the Morea was lost. The discovery of America and of the passage around the cape of Good Hope had in the mean while diverted enterprise and commerce into new channels, and Venice, after being for centuries the centre of the trade between Asia and Europe, gradually declined. With the exception of unimportant contests with the piratical sovereigns of Tunis and Algiers, she remained at peace during the greater part of the 18th century. During the wars which followed the breaking out of the French revolution Venice declared her neutrality; but her hostility to France continually manifested itself, and finally Bonaparte declared war against her, and she was compelled to yield. In May, 1797, the French troops took possession of the city, which no hostile force had ever before entered. The hereditary privileges of the aristocracy were abolished; the great council was superseded by a provisional government; the destruction of the prisons and other buildings of the inquisition was decreed; the "golden book," containing the names of the hereditary nobility, was burned, and Venice lost her independence. By the peace of Campo Formio Venice with a large part of her territories was subjected to Austria. By the peace of Presburg in 1805 she was annexed to the kingdom of Italy. After the fall of Bonaparte she again passed under the dominion of Austria, forming a part of the Lombardo-Venetian kingdom. During the revolutionary movements of 1848 Venice in March revolted against the Austrian rule and proclaimed the restoration of the republic (see Manin); but after enduring a long siege and a terrible bombardment, she capitulated on Aug. 23, 1849, and on the 30th Radetzky entered the city, which was not released from the state of siege until May 1, 1854. By the peace of Villafranca in 1859 Venice was still left in the possession of the Austrians. After their defeat in the Austro-Prussian war of 1866 Venice and such of her former territories as were under Austrian rule were ceded to Napoleon III.; he immediately placed the government in the hands of the municipal authorities, who at once called upon the people to vote on the question of annexation to the kingdom of Italy. The election was held in October, and out of upward of 650,000 votes cast all but 69 were in favor of annexation. Victor Emanuel made his entrance into Venice Nov. 7. The emperor Francis Joseph of Austria met Victor Emanuel, for the first time after his loss of the dominion, at Venice, April 5, 1875.—See Tentori, *Saggio sulla storia di Venezia* (12 vols., Venice, 1785–'90); Count Daru, *Histoire de la république de Venise* (7 vols., Paris, 1819–'21); Philippi, *Geschichte des Freistaats Venedig* (3 vols., Dresden, 1828); *Venezia e le sue lagune* (3 vols., Venice, 1847); Ruskin, "The Stones of Venice" (3 vols., London, 1851–'3); Romanin, *Storia documentata di Venezia* (10 vols., Venice, 1853–'61); W. C. Hazlitt, "The History of the Venetian Republic" (4 vols., London, 1858–'60); Howells, "Venetian Life" (New York, 1866); Cicogna, *I dogi di Venezia* (2 vols., Venice, 1867); and Billitzer, *Geschichte Venedigs* (Trieste, 1871).

VENICE, Gulf of, the name given to the N. W. part of the Adriatic sea, where it forms an indentation in the coast of Venetia, extending about 50 m. from the mouth of the Tagliamento to the delta of the Po. The gulf of Trieste is its N. E. prolongation. Its depth is not more than 12 fathoms. It receives the waters of the Piave, Brenta, Adige, Po di Levante, Po della Maestra, and other rivers.

VENLOO, a fortified town of the Netherlands, in the province of Limburg, on the right bank of the Maas, 40 m. N. N. E. of Maestricht; pop. about 8,000. It has a large Catholic church, a fine town hall, two arsenals, a school of industry and design, manufactories of tobacco and other articles, tanneries, breweries, and distilleries, and much trade in hogs. A suspension bridge connects the town with Fort St. Michael on the left bank of the Maas; on the right bank is Fort Ginkel, and opposite Venloo is the fortified island of Waert or Weert. The place has undergone many sieges.

VENOM, a kind of secretion produced in certain animal bodies, which acts as a poison when introduced into the tissues of other animals. The characteristics of a venom, as distinguished from poisons in general, are that it is of organic origin, produced in special secreting organs, termed "poison glands," and that it is introduced into the tissues by means of certain organs specially adapted for the purpose, which have the form of stings or fangs. Thus we have the venom of the rattlesnake, the viper, the scorpion, and the tarantula. A virus, on the other hand, though also a poison of an organic, and usually an animal origin, is the result of diseased action or of putrescence, and usually has the power of exciting in the poisoned individual the same disease as that by which it was itself produced. Thus we speak of the virus of smallpox, of cowpox, and the like. The poison of hydrophobia is properly not a venom but a virus, since it is due to the presence of a diseased element in the natural secretion of the saliva, and reproduces the same disease by inoculation. A virus does not usually cause any local irritation; or if so, as in the case of cowpox or smallpox, it is quite insignificant as compared with the effect upon the system at large. A venom, on the other hand, generally produces great pain, swelling, and inflammation at the spot where it is applied; and its constitutional effect appears to be in great measure sympathetic with the local disturbance.

VENTILATION. See WARMING AND VENTILATION.

VENTRILOQUISM (Lat. *venter*, the belly, and *loqui*, to speak), a kind of vocal mimicry, by which an illusion is produced in relation to the source or direction from which the sound proceeds. The name, or at least its cognate terms in Greek and Hebrew, originated from the practice of the witches and persons supposed to have a familiar spirit among the Canaanitish nations and the Jews, and the diviners or prophesying priests and priestesses of the Greeks, causing the answers to the questions asked by those who consulted them to proceed apparently from the abdomen, in which, as they alleged, resided their familiar spirit or demon. The first attempts at ventriloquism were probably made in Egypt or India, in both of which countries it has been known from the earliest periods. That it was commonly practised in Egypt during the residence of the Israelites there is evident from the prohibitions of the Jewish lawgiver against it after the exodus, in Lev. xix. 31, and xx. 6, 27, and Deut. xviii. 10–14. The early inhabitants of Canaan had also practised it, as appears from the last passage named. In all these cases the term translated "having a familiar spirit" signifies in the original "speaking from the belly." Notwithstanding the death penalty pronounced against it, the practice of divination or ventriloquism continued among the Jews, as the references to it in Isaiah and the other prophets fully demonstrate. Nor did it cease as a pretended means of revelation in the early centuries of the Christian era, as the case in Acts xvi. 16, the well known practice of gastromancy among the later Greeks, and the repeated references of St. Chrysostom and other early Christian fathers, sufficiently prove. Its use for such purposes was finally abandoned during the middle ages. In the early part of the 16th century Louis Brabant, valet de chambre of Francis I., employed it to secure the consent of the mother of his betrothed to his marriage with her daughter, and also to extort from a rich miser a large sum of money. In 1772 the abbé de la Chapelle published an account of two eminent ventriloquists, Baron Mengen at Vienna and M. Saint-Gille near Paris, who were very successful in producing illusions by means of vocal mimicry, and causing the voices which they imitated to appear to come from trees, the earth, or the bodies of animals. These gentlemen made no secret of their performances, but attributed their skill to their fondness and talent for mimicry, which enabled them to imitate accurately all kinds of sounds. M. Saint-Gille displayed his skill before commissioners of the French academy of sciences, who investigated the subject with great care. Since that period ventriloquism has become common, and most of the so-called magicians, wizards, and sleight-of-hand performers practise it. Thiernet, Borel, Fitzjames, Houdin, and Alexandre in France, and Charles Mathews and others in England, enjoyed a high reputation for their success in this art. M. Comte, a celebrated French ventriloquist, was the first to demonstrate the possibility of cultivating it by scientific methods, and several eminent singers have resorted to it to produce unusual musical effects. It was supposed for many years, and eminent physiologists gave countenance to the theory, that some peculiarity in the conformation of the larynx was requisite for ventriloquism, or at least that it was accomplished by processes essentially different from those adopted in ordinary speaking or singing; but it has been demonstrated that the vocal organs of the ventriloquist are the same as those of other men, nor is his use of them materially different from that of others. For success in his art, he requires only keen perceptions, an ear delicately attuned to the variations of sound produced by distance or direction, and a strongly developed mimetic faculty. The vocal organs have the power of imitating under skilful training all the sounds of animate or inanimate life, and in such a way as to represent them as heard at greater or less distances and from different directions. The ventriloquist is well aware that no one of our senses is more easily deceived than that of hearing, because in listening to sounds we judge of their remoteness by comparing them with other sounds whose distance we are familiar with, and determine their distance by an arbitrary and often incorrect estimate of their relative volume at the place of their supposed emission. Aware of this, he utters the sound with the effect it would have upon the hearer's ear if it had really traversed the distance he designs it to represent, reducing its loudness, softening somewhat its quality or tone, and, if it is in words, obscuring a little the consonant sounds, while retaining unaltered the pitch and duration. In doing this, he modifies the tones of his voice by varying the position of the tongue and the soft palate, dilating or contracting the mouth or pharynx, and either dividing the buccal and pharyngeal cavities into several compartments or throwing them into one. This is done without movement of the lower jaw and with but slight motions of the lips, while by means of skilful and apparently natural gestures the attention of the hearer is diverted from the ventriloquist himself to the point from which the voice or sound is supposed to proceed. Usually the ventriloquist stands so as to give only a profile view of his face, unless at a distance from his audience, and thus has greater opportunity of concealing any slight motions of the facial muscles. In most cases, too, the apparently remote voice is a falsetto, this being more within the command of the performer, without perceptible facial movement, than the natural tones. (See VOICE.)

VENTURA, a S. W. county of California, bordering on the Pacific ocean, and drained by Buenaventura and Santa Clara rivers; area, about 2,000 sq. m. It has been formed since the census of 1870. The surface is generally mountainous. The valleys are very fertile. Cattle and sheep are largely raised, and Indian corn, barley, grapes, oranges, and other semi-tropical fruits are grown. Various minerals are found. Capital, San Buenaventura.

VENTURA DE RAULICA, Gioacchino, an Italian pulpit orator, born in Palermo, Dec. 8, 1792, died in Versailles, Aug. 3, 1861. He was educated in the Jesuit college of Palermo, and entered the society of Jesus, but left it to become a Theatine. His first pulpit discourses marked him as one of the greatest orators in Italy. He became general secretary of his order, contributed largely to its restoration, and published *La causa dei regolari al tribunale del buon senso.* Subsequently he was named censor of the press and member of the royal council of public instruction for the kingdom of Naples, and used his influence to introduce into Italy the new traditionalist philosophy of France. He became especially distinguished for his funeral orations. In 1824 he was appointed general of the order of the Theatines, and fixed his residence at Rome, where he was made a member of a commission of censorship; at the same time he was presented to the chair of ecclesiastical law in the university of Rome, and soon after made almoner of the same institution. He was prominently employed in diplomatic affairs. In 1828 he published *De Methodo Philosophandi*, in defence of the scholastic philosophy. This was bitterly attacked by the abbé Lamennais; and, wearied of the controversies which ensued, Ventura quitted the pontifical court, and spent ten years in retirement. In 1839 appeared his work *Delle bellezze della fede* (3 vols. 8vo). During this period also he preached his finest sermons in the church of S. Andrea della Valle and at St. Peter's, and his published homilies fill 5 vols. 8vo. After the death of Gregory XVI. he exerted himself to secure the election of Cardinal Mastai-Ferretti, and became one of the private counsellors of the new pope. In 1847 he preached the funeral sermon of O'Connell, the liberal opinions advanced in which gave him great influence with the people. At the beginning of 1848 the popular government of Sicily made him minister plenipotentiary and commissioner extraordinary to the court of Rome. He published a treatise "On the Independence of Sicily," another "On the Legitimacy of the Acts of the Sicilian Parliament," and subsequently an octavo volume entitled *Mensonges diplomatiques.* He also labored with Gioberti and Rosmini to effect a commercial union of the Italian states as a first step toward a political confederacy. On May 4, 1849, he retired under the protection of the French to Cività Vecchia, and afterward to Montpellier in France. There he wrote "Letters to a Protestant Minister" (12mo, 1849), in answer to a clergyman of Geneva, who maintained that St. Peter had never been in Rome. After remaining two years at Montpellier he went to Paris, where he drew crowds to the churches of the Madeleine and St. Louis d'Antin. He published there *Histoire de Virginie Bruni* (12mo, 1850); *Les femmes de l'Évangile* (12mo, 1852); *La raison philosophique et la raison catholique* (8vo, 1852); *Essai sur l'origine des idées* (8vo, 1853); *La femme catholique* (3 vols. 8vo, 1854); *L'école des miracles, ou les œuvres de la puissance et de la grandeur de Jésus-Christ* (2 vols. 18mo, 1854–'5); and *Le pouvoir chrétien* (8vo, 1857).

VENUS, in Roman mythology, the goddess of love, especially of sensual love. She was originally considered a divinity of very little importance, and no mention was made of her in the documents relating to the early history of Rome. In later times the Romans identified her with the Greek Aphrodite, and adopted all the myths relating to that goddess. Aphrodite was among the Greeks one of the great Olympian divinities and the goddess of love and beauty. The Iliad makes her the daughter of Jupiter and Dione; later traditions assign to her a different parentage. The one most generally adopted, because best suited to the poetical imagination of the Greeks, represented her as having sprung from the foam of the sea, whence her name, from the Greek ἀφρός, foam. She first landed at Cythera, and thence went to Cyprus. Wherever she trod, flowers sprang up. These two islands were the principal seats of her worship, and from them she was called the Cytherean, Paphian, and Cyprian Aphrodite. She was married to the deformed god Hephæstus (Vulcan), but had many amours both with other gods, especially Mars, and with mortals. Of the latter, Adonis inspired her with the fondest passion. To the Trojan Anchises she bore Æneas, from whom the Roman poets and historians traced the descent of Romulus. Paris awarded her the golden apple, the prize of beauty, in preference to Juno and Minerva; and she consequently sided with the Trojans in the war against their city. She had a *cestus* or girdle which inspired the beholder with a passionate love for the one who wore it. Among plants and birds, the poppy, apple, myrtle, and rose, and the sparrow, swallow, swan, dove, and lynx or wryneck, were her favorites. The planet Venus and the month of April were sacred to her. Young animals were sometimes sacrificed to her, but usually the offerings consisted of incense and garlands of flowers. Festivals were celebrated in her honor, the principal of which were called *Aphrodisia.* Modern scholars regard Aphrodite as originally identical with the Phœnician Astarte (in the Bible Ashtoreth), or with Baaltis (by some identified with the Asherah of the Bible), and think that her worship was introduced at a very early period by the Phœnicians into Cyprus and Cythera, whence it spread over Greece, and in the course of its development became wholly Grecian.—Venus was a favorite subject of ancient sculpture. The statues known as the Venus de' Medici and the Venus of Milo are among the most celebrated works that have been preserved from antiquity. The former, exhumed in the 17th century in 11 pieces, is in Florence; the latter, found in the island of Milo in 1820, is in the Louvre, in Paris.

VENUS, the second planet in order of distance from the sun. According to the estimate of the sun's distance used throughout this work (91,430,000 m.), Venus travels at a mean distance from the sun of about 66,134,000 m. The eccentricity of her orbit is small, not exceeding 0·00686, so that her greatest distance, 66,586,000 m., does not exceed her least distance, 65,682,000 m., by more than about 900,000 m. In estimating her greatest and least distances from the earth, accordingly, it is more important to notice the effect of the earth's variation of distance, which amounts (see EARTH) to about 3,000,000 m. The actual point of nearest approach between the two orbits lies in longitude about 70°, and here the orbits are about 24,150,000 m. apart; this then is the nearest approach Venus can ever make to the earth. The orbits are furthest apart in about longitude 250°, where they are separated by about 26,500,000 m.; and adding to this the diameter of Venus's orbit, about 132,300,000 m., we find the greatest distance separating the two planets to be about 158,800,000 m. The mean inclination of Venus's orbit to the ecliptic is about 3° 23′ 31″; but her path is not so largely inclined to the mean plane of the solar system. Her mean sidereal revolution is completed in 224·700787 days, and her mean synodical revolution in 583·920 days. Her diameter is about 7,510 m.; her volume 855 thousandths of the earth's, her mass about 885 thousandths (her density exceeding the earth's in the proportion of 103 to 100). Venus, travelling on a path within the earth's, is never seen in opposition, passing between the earth and sun when at her nearest. At this time she is of course invisible, her dark hemisphere being turned toward the earth. On the other hand, when she turns her fully illuminated hemisphere toward the earth, she is not only at her furthest, but lies almost directly on the prolongation of a line directed toward the sun, and is therefore lost in his superior lustre. Between these phases she exhibits all the figures shown by the moon, passing from a nearly full disk to the finest crescent (as an evening star), and from finest crescent, after her disappearance in inferior conjunction, to nearly a full disk (as a morning star), when she again disappears in superior conjunction. But as her distance from the earth, unlike the moon's, undergoes great variations, she varies in apparent size as well as in phase, having the least diameter when nearest to a full orb, and the greatest when her crescent of light is finest. She lies furthest from the sun in the heavens when her disk is about half illuminated, the distance (her elongation, as it is called) varying in different synodical revolutions from about 45° to about 47° 12′.—Although this planet approaches the earth so much more closely than her rival in beauty, Jupiter, it has not been found possible to examine her surface with the telescope to any very useful purpose. Her great brightness introduces a difficulty which does not exist in the case of Jupiter, closely though he resembles her in appearance when both are seen under like conditions with the unaided eye; for the illumination of Venus exceeds that of Jupiter (mile for mile of surface) fully 48 times, though the intrinsic brilliancy of Venus does not surpass Jupiter's much more than 20 times. It is singular that, notwithstanding this difficulty, the first observers with the telescope achieved considerable success in recognizing and watching spots on her surface. In fact, the best telescopes of modern times fail to show spots which Cassini, Bianchini, and others of the early observers agree in describing. If the earlier observers had deduced different rotation periods, we should be led to conclude that the spots they saw had no real existence; and this indeed has been the general conclusion to which modern astronomers have been led. Yet it should be noted that in presence of the close agreement between the rotation periods deduced by Cassini, Schröter, and De Vico, it is difficult to reject altogether the evidence which led to such closely accordant results. Domenico Cassini, after long seeking in vain for recognizable marks, noted in 1667 a bright spot not very far from the southern horn of the planet; and from observations of this spot he deduced a rotation period of about 23 hours. In 1726 Bianchini made observations whence he deduced the monstrous period of 24 days 8 hours. (It was on this rotation period that Ferguson based his remarkable account of the diurnal phenomena of Venus.) The younger Cassini, having carefully compared his father's observations with Bianchini's, found that both series could be explained by a rotation period of 23 hours and between 21 and 22 minutes, whereas a period of 24 days 8 hours could not be reconciled with D. Cassini's observations. This explanation was received, because it was known that Bianchini's observations were not continuous, but interrupted for want of sky room, a neighboring building interfering with his view of the planet. Schröter's observations led to the rotation period 23 h.

21 min. 19·2 sec. They were made on a mountain (or what he took to be such) near the southern horn of Venus. He remarked that while the northern horn always preserved its proper pointed figure, the southern sometimes appeared rounded, which circumstance he considered due to the presence of a mountain whose shadow fell on the place where the horn should have been. Beyond this place he observed a luminous point which he regarded as the summit of another mountain, illuminated by the sun. The proper position for showing these appearances cannot be long maintained, as the planet rotates, and thus their recurrence affords a means of determining the rate of its rotation. By taking as many as 160 rotations, Schröter deduced the rotation period mentioned above. De Vico at Rome, in 1839–'41, made a series of observations, confirming Bianchini's drawings in a remarkable degree. He deduced the rotation period 23 h. 21 min. 22 sec. Accepting this result, we find for the three planets Venus, the earth, and Mars, in this order (the order of their distances), the rotation periods 23 h. 21 min. 22 sec., 23 h. 56 min. 4 sec., and 24 h. 37 min. 23 sec., increasing with distance from the sun in a nearly uniform manner.—While, as we have said, it seems impossible to reject the evidence afforded by the observations of Schröter, De Vico, and others, in favor of the existence of recognizable marks on Venus, yet as many of the ablest observers, using the finest telescopes of our day, have failed to recognize such spots, we must adopt Sir John Herschel's explanation, who says that "the most natural conclusion from the very rare appearance and want of permanence of the spots is, that we do not see, as in the moon, the real surface of the planet, but only its atmosphere, much loaded with clouds, serving to mitigate the otherwise intense glare of the sunshine." It is clear from other circumstances that Venus has an atmosphere. During her transits over the sun's disk in 1761 and 1769 a sort of penumbral light was observed round her disk. Wargentin observed that the part of the disk off the sun could be recognized by a faint light bordering it, during almost the whole time of emersion. Bergman, who observed the transit of 1761 at Upsal, states that at ingress the part of Venus still off the sun could be seen, being bounded by a crescent of light. At the egress this appearance was even more remarkable. As more of the planet's disk passed off the sun's, the part of the crescent of light furthest from the sun grew fainter and ultimately vanished, so that at last only the horns could be seen. Many other accounts of these two transits contain similar statements, and during the recent transits the same appearances were seen by many observers. It is readily perceived that such appearances might be expected in the case of a planet surrounded by an atmospheric envelope. The sun would be raised by atmospheric refraction precisely as our own sun is raised above the horizon after he has really passed below it. When we look at the part of Venus furthest from the sun, before immersion or after emersion (at a transit), we are looking in the same direction as an observer of Venus at that part who should direct his gaze sunward. As he would see the sun raised above the horizon by atmospheric refraction, though really below, so we see the sun doubly raised because the line of sight passes through the hither half as well as the further half of the atmosphere above that part of Venus. In other words, though the outline of the sun's disk is really (that is, in a geometrical sense) behind the disk of Venus, we receive actual sunlight round even the part of Venus's disk remotest from the sun; *a fortiori* then is sunlight received round the remaining part of Venus's disk which lies outside the sun's. Hence an arc of light, brightest near the cusps of Venus, but visible (soon after immersion begins and again till near the end of emersion) at the part of Venus remotest from the sun. Prof. Lyman of Yale college has even seen this light at the part remotest from the sun, when the whole disk of Venus has been off the sun's, as at inferior conjunctions where there has been no transit. From such an observation it may be inferred that the atmosphere of Venus is deeper than our own. For we can infer from Bergman's observations a horizontal refraction scarcely less than that of our own atmosphere; and Lyman's observation would imply an atmospheric refraction nearly twice as effective. The atmosphere of Venus has been analyzed with the spectroscope by Huggins, Vogel, and others, and the presence of aqueous vapor is held to have been demonstrated by the observations; yet it was not until the transit of 1874 that this point was in reality established. On that occasion Tacchini's observations seemed to demonstrate the fact that there is water on Venus.—A curious question is raised by the apparently strong evidence obtained during the 18th century to show that Venus is accompanied by a satellite. It is quite certain now that no such satellite exists, yet several skilful observers not only imagined that they perceived such a satellite, but even assigned to it a definite period of revolution around its primary. During the transits of 1761, 1769, and 1874, it was conclusively shown that no such body exists, but the difficulty of accounting for the apocryphal observations remains as great as ever.—Thirteen sidereal revolutions of Venus are completed in a period very nearly equal to eight sidereal years. Hence at every fifth conjunction the planets return nearly to the same longitude. Accordingly the perturbing effects taking place at one conjunction are repeated at the fifth conjunction thereafter, and so on. Consequently there is an accumulation of perturbations, resembling the great inequality of Saturn and Jupiter, though far less remarkable in amount. It has for its period about 240

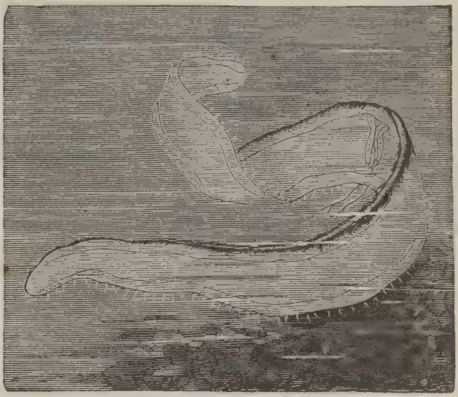
years. The greatest acceleration and retardation of either planet amount only to a few seconds of arc. (For transits of Venus, see supplement, and the article TRANSIT.)

VENUS'S FLOWER BASKET, the common name of the *euplectella speciosa* (Gray), a very beautiful silicious sponge, found among the Philippine islands. The animal framework or skeleton, which in the living specimen is covered with the usual fibro-gelatinous substance of the sponges, is made up of silicious fibres, running from base to top, surrounded by smaller ones, forming open meshes resembling a basket or network, or delicate lace-like fabric. It is of a regular cornucopia shape, from 6 to 15 in. high, about an inch in diameter at the base, which is attached to some submarine object, gradually increasing to nearly 2 in. at the top; it is surmounted by a ridge about a quarter of an inch wide, and is closed above by a delicate network; the shape is very elegant, and the structure light. It sometimes encloses a hermit crab, which has entered for protection and been covered in by the growing sponge. By immersing the sponge in a dilute solution of chloride of soda or lime, the gelatinous film is removed, and the lace-like structure of pure silex is left untouched. The first specimen obtained was valued at over $150, but now they cost only a few dollars.

Venus's Flower Basket (Euplectella speciosa).

VENUS'S FLY TRAP. See DIONÆA.

VENUS'S GIRDLE, the common name of the *cestus Veneris* (Les.), an acaleph or jelly fish of the order of *ctenophoræ* or beroid medusæ, allied to *pleurobrachia.* (See CTENOPHORÆ.) It is gelatinous and free-moving, but elongated in a direction at right angles to the alimentary canal, forming a ribbon-shaped body 4 or 5 ft. long and 2 or 3 in. high; the edges are provided with vibratile cilia; the mouth is below and in the median line. It is common in the Mediterranean, near Naples, appearing at night like a band of phosphorescent flame.


Venus's Girdle (Cestus Veneris).

VERA CRUZ. I. A state of Mexico, bounded N. W. by San Luis Potosí, N. by Tamaulipas, E. by the gulf of Mexico, Tabasco, and Chiapas, S. W. by Oajaca, and W. by Puebla and Hidalgo; area, 27,433 sq. m.; pop. in 1873, 459,262. Capital, Jalapa. It is traversed by the Sierra Madre, and is generally mountainous, excepting the sandy coast region, about 30 m. wide. The highest peak is Orizaba or Citlaltepetl (Star mountain), 17,176 ft. high, on the border of Puebla. The Cofre de Perote, near Jalapa, is 14,309 ft. high, and San Martin or Tuxtla 9,708 ft. All of these are volcanoes, and Orizaba is perpetually snow-capped. The principal rivers are the Pánuco, Alvarado, and Coatzacoalcos, the mouths of all of which are obstructed by sand bars. There are several large lagoons on the coast, of which Tamiagua is about 60 m. long and 20 m. broad. Alvarado, the largest in the south, is divided into smaller lagoons by many islands. The climate is hot (80° to 85°) and insalubrious on the coast, where yellow fever prevails from May to November; but in Jalapa, Córdoba, Orizaba, and other elevated places, it is agreeable and healthful. The soil of the interior is very fertile, and produces, according to elevation, a vegetation ranging from tropical almost to arctic. Sugar is cultivated in all of the 18 cantons, coffee in 15, tobacco in 14, cacao in 11, and vanilla in 5. Cotton also is extensively cultivated, as well as the cereals and fruits. The coffee is very fine, and the tobacco is said to equal the Cuban. Cattle are raised in great numbers. Among the mineral products are gold, copper, lead, and iron. The total value of manufactures in 1873 was $2,374,400, the principal products being woollen and cotton cloths. In 1875 there were 528 public schools in the state, with an aggregate attendance of 19,702, 18 colleges or grammar schools, 6 schools attached to state prisons, and a military school. Vera Cruz is divided into 18 cantons: Acayucan, Chicontepec, Coatepec, Córdoba, Cosamaloapan, Huatusco, Jalapa, Jalacingo, Minatitlan, Mizantla, Orizaba, Papantla, Tampico, Tantoyuca, Tuxpan, Tuxtla, Vera Cruz, and Zonzolica. **II.** A city of the preceding state, in a marshy plain on the shore of the gulf of Mexico, lat. 19° 11′ 56″ N., lon. 96° 8′ 36″ W., 190 m. E. S. E. of the city of Mexico; pop. about 10,000. It is built in a semicircle fronting the sea, and is enclosed by a wall 6 ft. high and 3 ft. thick, and defended by two redoubts on shore and the castle of San Juan de Ulua or Ulloa, which stands on an island of the same name about half a mile from the shore. The streets are regular and wide, and form 66 squares, and some of those running E. and W. have a stream in the middle. The houses are strongly built of coral limestone, in the old Spanish style, enclosing a square court with covered galleries. Most of the windows are furnished with iron gratings, and window glass is not common. Among the principal buildings are the municipal palace, built in 1609, custom house, provincial treasury, commandant general's office, and the old convent of San Francisco, the tower of which was fitted as a lighthouse in 1872. In the same building is the public library, founded in 1870. There are also several churches, a theatre, bull ring, exchange, casino, three hospitals, and an artillery school. The city is lighted with gas, is supplied with water from the river Jamapa, and has a horse railway. The harbor is merely an open roadstead between the city and the castle, and is very insecure. A new mole was finished in 1875, but it is unapproachable during northers by any but small boats. On one of the bastions of San Juan de Ulua is a lighthouse, and on another a watch tower. There are also a chapel and a cemetery on the island. Besides this island there are in the roadstead a small island called Verde, and the Sacrificios and Blanquilla isles. Vera Cruz is the most important port of the republic; its exports amount annually to about $25,000,000, and its imports to $26,000,000. Of the latter, about $2,000,000 are from the United States. During the year ending June 30, 1874, 3,449 vessels entered the port, of which 2,278 were engaged in the coasting trade. The chief exports are coffee, vanilla beans, hides, tobacco, cochineal, caoutchouc, jalap, fustic, and indigo. Smuggling is common, and the official commercial returns seldom amount to more than half the real value of the trade. Vera Cruz is connected by railway with Mexico, with Medellin, and with Jalapa and Boca del Potrero, and by steamers with New York, New Orleans, the West Indies, and Europe.—The city of Villa Rica de Vera Cruz was founded by Cortes in 1519, a short distance N. of the present site; but it was abandoned in a few years for a position near the mouth of the Antigua, which was called Antigua Vera Cruz. About 1590 it was again removed to the present site and named Nueva Vera Cruz. Philip III. conferred on it the title and privileges of a city in 1615. The castle of San Juan de Ulua, which was the last foothold of the Spaniards in Mexico, was surrendered by them to the patriots in 1825. In 1838 Vera Cruz was bombarded and taken by the French, and in 1847 by the Americans under Gen. Scott. It surrendered to the allied British, French, and Spanish squadron

Vera Cruz.

in December, 1861, and was restored to Mexico in 1867.

VERATRINE, or **Veratria,** an organic base discovered in 1818 by Meissner in sabadilla seeds, *veratrum sabadilla*, and soon afterward by Pelletier and Caventou in white hellebore, *veratrum album.* It probably exists also in other species of *veratrum.* It is prepared by dissolving the alcoholic extract of the seeds in sulphuric acid. The solution is then treated with animal charcoal, and the veratrine, together with sabadilline, precipitated by an alkali. The precipitate is then again dissolved in dilute sulphuric acid, and nitric acid is added as long as it produces a black pitchy precipitate. To the filtrate dilute potash solution is added, again precipitating the veratrine, which is then washed and dried and dissolved in absolute alcohol. The alcoholic solution is then evaporated; the residue is boiled in water, the impure veratrine which remains is dissolved out by ether, and the ethereal solution on evaporation leaves the pure base veratrine. Delondre prepares veratrine by treating the crushed sabadilla seeds with very dilute hydrochloric acid in a displacement apparatus, precipitating the solution with slight excess of potash, and slightly heating the washed and dried precipitate with twice its weight of ether for four hours in a closed vessel provided with a safety tube. The ethereal solution on evaporation leaves pure veratrine.—Veratrine is ordinarily a white or whitish green crystalline powder, but by slow evaporation of its alcoholic solution it may be obtained in long prisms with a rhombic base. It is inodorous, but a minute quantity inhaled by the nostrils produces violent sneezing and headache. It is very acrid and poisonous, producing vomiting and purging when taken internally. It has a peculiar influence on the nervous system. Dr. J. L. Van Praag, in extensive experiments on the lower animals, found that it lowered the circulation and respiration, diminished the irritability of many of the nerves, and produced muscular relaxation, and in larger doses vomiting and purging. The secretion of saliva was much increased, but the urine was little affected. In poisonous doses the depressing effects were preceded by an accelerated pulse and respiration, and tetanic muscular spasms, followed by a characteristic dancing movement. It is used in medicine, both externally and internally. The diseases in which it has been employed are chiefly gout, rheumatism, neuralgia, dropsy, and functional diseases of the heart. Prof. Vogt of Bern employs it in pneumonia, in doses of about $\frac{1}{30}$ of a grain every two hours, gradually increased to ten times that quantity. It has also been employed in various nervous affections, as whooping cough, epilepsy, hysteria, and disorders caused by spinal irritation. From $\frac{1}{12}$ to $\frac{1}{6}$ of a grain may be given in the form of a pill, repeated every three or four hours, till its effects are produced. The tartrate, sulphate, or acetate may be used. Veratrine is much more employed externally than by the stomach, and is applicable in this way to all the complaints already mentioned. It is used as a local application in chronic swellings and indurations of the joints, whether from rheumatism, scrofula, or sprains. It may be used dissolved in alcohol, or rubbed up with a little lard in the proportion of from 5 to 20 grains to the ounce.

VERATRUM. See HELLEBORE.

VERBENA (Lat. *verbenaca*, vervain, from *verbenæ*, sacred boughs), the botanical and common name of a very large genus of herbs and shrubs, abundant in tropical countries; also called vervain, and in France *verveine.* The genus gives its name to a family, the *verbenaceæ*, which is closely related to the labiates, the most important difference being that in this the ovary is entire with the style attached at the top; the plants are generally without the aromatic qualities of the labiates. The teak tree (*tectona*) is an important member of the family. The verbenas have opposite, often much divided leaves; the flowers sessile, in bracted spikes, or in a flat cluster which elongates after flowering; calyx five-toothed; corolla tubular, often curved, with a spreading, rather unequally five-cleft limb; the included stamens four; the fruit when ripe splitting into four one-seeded nutlets. Formerly some of the species were regarded as medicinal, and several are said to be emetics. There are less than a dozen species in the United States, some of which in the wild state hybridize remarkably, and produce puzzling intermediate forms. The most common are coarse, weed-like, unattractive plants, found in old fields, along roadsides, and in waste places. The nettle-leaved verbena (*V. urticifolia*) is 4 to 6 ft. high, with coarsely toothed leaves, and long slender spikes of small white flowers; the blue verbena (*V. hastata*) is about as tall, with dense spikes of blue flowers; both are very common, and are often found together. The narrow-leaved, hoary, and bracted verbenas are mostly western and southern species; the European verbena (*V. officinalis*), a coarse inelegant species about 2 ft. high, is sparingly naturalized, especially in the southern states. The only one of our native verbenas sufficiently showy to be

Verbena. Garden Hybrids.

cultivated is *V. Aubletia*, which, with the absurd name of Rocky mountain verbena, and the incorrect botanical name *V. montana*, was a few years ago largely advertised as a new discovery; it is found southward and westward from Illinois and the Carolinas; the plant has the spreading habit and the deeply cleft leaves of the garden verbenas, with light purple flowers, and has been used in the various crossings which have produced these. —The garden verbenas are among the most popular of garden flowers, and have become so thoroughly mixed by numerous hybridizings and crossings that it is difficult to trace the now popular varieties to their origin. *V. chamædrifolia* was introduced into England in 1825 from Buenos Ayres, and *V. phlogifolia* into New York from Brazil in 1835; the first is the original scarlet, and the other the original rose-colored; about the same time seeds of *V. teucrioides*, with white flowers, were sent to this country from Brazil; and with these three our florists produced a series of hybrids, remarkable for the brilliancy and great variety of their flowers; they comprise every color and shade, from pure white to the deepest maroon, except a yellow and a positive blue, though a close approach to blue has been attained. European florists have also been engaged upon this plant, and the named varieties are almost innumerable, with yearly additions to the list; great improvement has also been made in the size and substance of the flower, form of truss, and habit of the plant; a distinct bright eye to each flower is essential, and in the striped varieties there must be no blending of colors. The verbenas, on account of their easy propagation, rapid growth, and brilliant, constant, and long-continued flowering, are the most popular flowers for producing color effects in that style of gardening known as bedding or massing, and are among the few that are really successful in our hot summers. The propagation from cuttings is rapid and easy, every joint making a plant; so readily does the stem throw out roots, that if a bouquet be left in water for a few days, the verbena stems will be found with minute rootlets. Where no particular colors are desired, the plants may be raised from seed, and if sown in the open ground in May will bloom in August.—The sweet-scented or lemon verbena belongs to a different genus of the same family; it is *Lippia* (formerly *Aloysia*) *citriodora*, a low, weak-branched shrub from Chili, with whorls of linear-lanceolate roughish leaves, and small, slender spikes of bluish white flowers; the leaves abound in glandular dots which contain a volatile oil, the fragrance of which is generally acceptable, and they are much used in summer bouquets. The plant is deciduous, and must have a season of rest; it is usually set in the open ground in spring, and housed in winter under the stage of a greenhouse or in a cellar. It can be trained in the form of a tree, with a distinct trunk and round head.

Hybrid Garden Verbenas.

VERBOECKHOVEN. I. Eugène Joseph, a Belgian painter, born at Warneton, West Flanders, June 8, 1799. He studied under his father, who had settled in Brussels as a sculptor, and learned painting alone. In 1821 he became known as an animal painter by his "Cattle Market at Geneva." In 1834 he received 10,000 francs from Baron James de Rothschild of Paris for his "Herd of Cattle in an Autumn Landscape." Some of his subsequent works, several of which are in the United States, brought still higher prices. Among them are "A Herd of Sheep overtaken by a Storm," "Horses attacked by Wolves," and "A Herd of Cattle in the Roman Campagna." He has published several volumes of etchings. **II. Charles Louis**, a Belgian painter, brother of the preceding, born in 1802. He was a pupil of his brother, and at first painted animals; but he afterward resided in Holland, devoting himself to marine painting. His works include "Fishing Boats drying their Sails," "Rising Tide," "Fishing Vessels in sight of Fort Lillo," and "View of the Port of Flushing."

VERCELLI (anc. *Vercellæ*), a city of Piedmont, Italy, in the province of Novara, on the W. bank of the Sesia, 40 m. N. E. of Turin; pop. in 1872, 27,349. It is the capital of a district of the same name, formerly a province, and is the seat of a bishop. The ramparts have been converted into boulevards. The Milan gate is of fine architecture. The cathedral, of the 16th century, is the most celebrated among many fine churches. It contains the tombs of St. Eusebius and St. Amadeus, and a library with manuscripts of great antiquity. The town has a palace, once the residence of the dukes of Savoy, a hospital with a picturesque cloister, a crypt-like Gothic chapel, a small museum with a botanic garden, a lyceum, a gymnasium, a technological school, an episcopal seminary, and a theatre. The main products of the environs are rice, hemp, flax, and silk, which is manufactured here.—The ancient Vercellæ, probably several miles from the present city, was the chief town of the Libici, in Cisalpine Gaul, and became a fortified Roman *municipium*. The Raudian fields, on which Marius defeated the Cimbri in 101 B. C., are supposed to have been near Vercellæ, though some place them near Verona. In the middle ages it was a lordship, and for some time a republic. In 1427 it was ceded by Milan to Savoy. Spain held it from 1638 to 1659, after which it remained in possession of Savoy till 1704, when the French, to whom it surrendered, razed the fortifications. In 1786 it was retaken.

VERCHÈRES, a S. W. county of Quebec, Canada, bounded N. W. by the St. Lawrence and S. E. by Richelieu river; area, 195 sq. m.; pop. in 1871, 12,717, all but 100 of French origin. It is traversed in the south by the Grand Trunk railway. Capital, Verchères.

VERD, Cape. See CAPE VERD.

VERD ANTIQUE. See MARBLE, vol. xi., pp. 147, 148.

VERDI, Giuseppe, an Italian composer, born at Busseto, in the duchy of Parma, Oct. 9, 1814. His father was an innkeeper, and his first instructions in music were given him by an obscure organist. In 1833 Antonio Barezzi offered to provide the means for his instruction at Milan. Failing to obtain an entrance into the conservatory, he was placed under the instruction of Lavigna, a member of the orchestra of La Scala. After studying operatic composition for six years, Verdi produced in 1839 his first work, *Oberto di San Bonifazio*, which met with moderate success. His next effort, a comic opera hastily written to order in 1841, called *Un giorno di regno*, was a positive failure. In 1842 he presented *Nabucco*, which instantly established his fame. In this work he developed those characteristics of brilliant melody and vivid musico-dramatic effects which have maintained his popularity undiminished to the present time. In 1843 he produced *I Lombardi*, a work of similar musical character to *Nabucco*, though somewhat more finished in detail. During the years 1844–'5 he wrote four grand operas, *Ernani*, *I due Foscari*, *Giovanna d'Arco*, and *Alzira*. For a time *Ernani* was the most popular of his works. Its qualities are extreme vigor and brilliancy of melody, without floridity, strongly marked melodramatic effects, and very resonant orchestration. It was first represented at Venice in March, 1844. At Venice he produced in 1846 his *Attila*, a feeble work, and at Florence in 1847 *Macbeth*, which, though exceedingly faulty, secured extraordinary public recognition. The composer was called before the audience more than 30 times at each of the first three performances, escorted to and from the theatre by triumphal processions, and offered the testimonial of a golden crown. This, however, was not exclusively an artistic laudation. Verdi was an ardent sympathizer with the liberal politicians of Italy, and the libretto of *Macbeth* was full of allusions to which the populace attached a political significance. In 1847 Verdi also visited London, and there produced *I masnadieri*, in the representation of which Jenny Lind took the principal part. In the same year his *Lombardi* was given, with French words and under the title *Jérusalem*, at the grand opera in Paris. In 1848 he wrote for Trieste *Il corsaro*, which failed, and for Rome *La battaglia di Legnano*, which was interdicted on account of the political bearing of the story. In 1849 he wrote for Naples *Luisa Miller;* in 1850, for Trieste, *Stiffelio;* in 1851, for Venice, *Rigoletto;* in 1853, for Rome, *Il trovatore;* and in the same year, for Venice, *La traviata*. In 1855 *Les vêpres siciliennes* was produced at the grand opera in Paris; and *Un ballo in maschera* was first represented in 1859 at Rome. His subsequent operas are *Aroldo* (a revision of his *Stiffelio*), *Simone Boccanegra*, *Una vendetta in domino*, *La forza del destino* (St. Petersburg, 1863), *Don Carlos* (1867), and *Aida* (Cairo, 1871). This last opera did much to elevate the reputation of its composer, being written with great elaboration. In 1874 he composed a requiem mass for the anniversary of Manzoni's death, which was performed under his direction in Paris, and in 1875 in London. He generally spends the winter at the Doria palace in Genoa. Verdi in 1859 was a member of the national assembly of Parma, and in 1861 of the Italian parliament; and in November, 1874, the king made him a senator.

VERDIGRIS. See COPPER, vol. v., p. 319.

VERDUN (anc. *Verodunum*), a town of Lorraine, France, in the department of Meuse, on the river Meuse, 130 m. E. N. E. of Paris; pop. in 1872, 10,738. The Meuse, which is navigable here, separates into several streams within the walls, which reunite on leaving the town. It has fine promenades, a cathedral and other churches, an episcopal palace and garden, an ecclesiastical seminary, a public library, and a theatre. The trade is in wine, liqueurs, confectionery, oil, grain, timber, and cattle; and linen and woollen fabrics, leather, &c., are manufactured. It has a strong citadel designed by Vauban, separated from the town by an esplanade, and the enceinte consists of ten fronts.—Verdun was a town of some importance under the Romans. Charlemagne's Frankish empire was divided into three kingdoms by the treaty of Verdun in August, 843. The Verdunois territory belonged to the dukes of Lorraine, who governed it through local counts. Baldwin, the brother of Godfrey of Bouillon, sold it to the bishop of Verdun, who gave it in fief for some time as a viscounty to the count of Monçon and Bar. Verdun early became a free imperial city of the German empire; but the bishops claimed absolute authority, and the numerous conflicts resulted in 1552 in French domination, which the Westphalian treaty sanctioned. The royalists surrendered the town to the Prussians, Sept. 2, 1792, in consequence of which the commander of the citadel (Beauregard) shot himself, and subsequently many of the former were executed by the republican authorities. In the war of 1870 Verdun surrendered after a siege of about a month, Nov. 8. Many officers and much artillery and war material fell into the hands of the Germans. Verdun was substituted for Belfort as a pledge to the Germans until the final payment of the war indemnity in 1873.

VERE. I. Sir Aubrey de, an Irish poet, born Aug. 20, 1788, died July 5, 1846. He succeeded to the baronetcy and family estates, in Limerick and Tipperary counties, in 1818. He published two dramatic poems, "Julian the Apostate" (1822) and "The Duke of Mercia" (1823), and "A Song of Faith, and other Poems" (1842). **II. Aubrey Thomas de,** an Irish author, third son of the preceding, born at Curra Chase, county Limerick, Jan. 10, 1814. He was educated at Trinity college, Dublin. He has published "The Waldenses, and other Poems" (1842); "The Search after Proserpine, and other Poems" (1843); "English Misrule and Irish Misdeeds" (1848); "Picturesque Sketches of Greece and Turkey" (2 vols., 1850); "Poems, Miscellaneous and Sacred" (1856); "May Carols" (1857); "The Sisters, and other Poems" (1861); "The Infant Bridal, and other Poems" (1864); "The Church Settlement of Ireland" (1866); "Irish Odes, and other Poems" (1869); "The Legends of St. Patrick" (1872); and "Alexander the Great, a Dramatic Poem" (1874).

VERGENNES, a city of Addison co., Vermont, on Otter creek, 7 m. from its mouth in Lake Champlain, and on the Rutland division of the Central Vermont railroad, 21 m. S. of Burlington; pop. in 1870, 1,570. Its area is only 480 by 400 rods, not quite 2 sq. m. The falls of Otter creek afford a large amount of hydraulic power, which is partially improved. The manufactures include curtain rolls, doors, sash, and blinds, furniture, guns, hubs, spokes, &c., pumps, leather, and nails. There are three churches, a graded school, a weekly newspaper, and a national bank. The state reform school for boys is situated here. The harbor is an excellent one, affording a sufficient depth of water for the largest vessels. In the war of 1812 Com. McDonough's fleet was fitted out here. The city was settled in 1766, and incorporated in 1788.

VERGENNES, Charles Gravier, count de, a French statesman, born in Dijon, Dec. 28, 1717, died in Versailles, Feb. 13, 1787. He early accompanied his relative M. de Chavigny on diplomatic missions, and was minister at Treves from 1750 to 1755, and afterward at Constantinople till 1768, when the prime minister Choiseul, dissatisfied with his failure to instigate a Turco-Russian war, recalled him on the ground of his having married a Greek woman of low degree; but after Choiseul's removal he was restored to the service in 1771 as minister to Sweden, and in 1774 he became minister of foreign affairs on the recommendation of Count de Maurepas. He was very friendly to the American patriots, and the treaties of commerce (Dec. 8, 1777) and of alliance (Feb. 6, 1778) with the American colonies, as well as the preliminary (Nov. 30, 1782) and the final treaty of peace with Great Britain (Sept. 3, 1783), were all concluded under his administration. In the mean time he had brought about the treaty of Teschen (May 13, 1779), ending the war of the Bavarian succession. At home, he contributed to the downfall of Necker, and in 1783 became president of the royal council of finance, and later of the new committee of finance; and in the same year he promoted the appointment of Calonne as comptroller general of that department. Louis XVI. lost in him one of his most judicious advisers at the most critical period of his reign. He wrote various memoirs, but the *Mémoire historique et politique sur la Louisiane* (Paris, 1802), attributed to him, is of doubtful authorship.

VERGIL, Polydore, an English historian, born in Urbino, Italy, about 1470, died in his native country in 1555. Being in holy orders, he was sent to England in 1501 by Pope Alexander VI. as collector of the tax called Peter's pence, which office he was the last to hold. He was made rector of Church-Langton in Leicestershire, archdeacon of Wells (1507), and a prebendary successively in the cathedrals of Hereford and Lincoln, and in St. Paul's, London (1513). When he had been nearly 50 years in England, he returned to Italy with a present of 300 crowns, and leave to hold his archdeaconry of Wells and his prebend at Hereford during life. His principal work is his *Historia Anglica* (fol., 1534), a history of England from the earliest time to the end of the reign of Henry VII. Two portions of an old English version of it have been printed by the Camden society (4to, 1844–'6). He also published a collection of *Adagia* or proverbs (1498); a work *De Rerum Inventoribus* (1499; translation by John Langley, with W. A. Hammond's "Account of the Author and his Works," Agathynian club, New York, 1868); three books of dialogues against divination, entitled *De Prodigiis* (Basel, 1531); and treatises *De Patientia*, *De Vita Perfecta*, and *De Mendaciis*. Some passages in his *De Rerum Inventoribus* were placed on the Index at Rome.

VERGNIAUD, Pierre Victurnien, a French revolutionist, born in Limoges, May 31, 1759, executed in Paris, Oct. 31, 1793. He was admitted to the bar in Bordeaux in 1781, where he gained great distinction. He warmly supported the revolution of 1789, and in 1791 was elected to the legislative assembly, of which he became vice president (Oct. 16) and president (Oct. 31). He advocated severe measures against the emigrants, acted generally in opposition to the monarchy, promoted the proclamation of the republic in 1792, and was elected to the national convention. On the trial of the king he supported the proposition to allow an appeal

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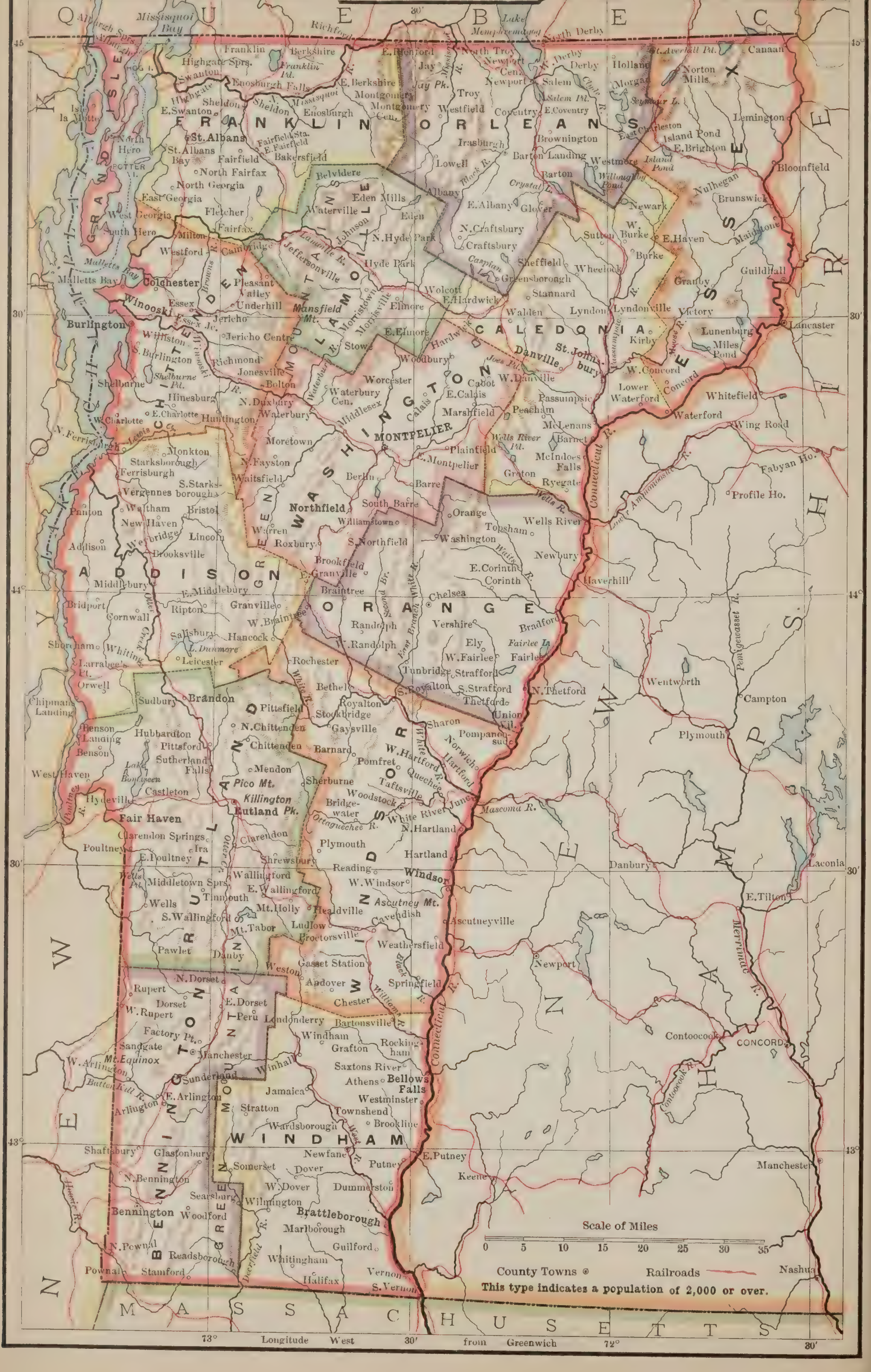

73°
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Q U E B E C
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LAMOILLE
CHITTENDEN
CALEDONIA
WASHINGTON
ADDISON
ORANGE
RUTLAND
WINDSOR
BENNINGTON
WINDHAM
GREEN MOUNTAINS
LAKE CHAMPLAIN
Missisquoi Bay
Lake Memphremagog
Richford
North Derby
Franklin
Berkshire
E. Berkshire
Highgate Sprs.
Swanton
Highgate
Franklin Pd.
Enosburgh Falls
Sheldon
Enosburgh
Montgomery
Montgomery Cen.
Jay
Jay Pk.
North Troy
Newport Cen.
Newport
Troy
Westfield
Derby
W. Derby
Holland
Morgan
Salem
Salem Pd.
Coventry
E. Coventry
Canaan
St. Averill Pd.
Norton Mills
Seymour L.
Lemington
E. Swanton
Isle la Motte
North Hero
St. Albans
St. Albans Bay
Fairfield
Fairfield Sta.
E. Fairfield
Bakersfield
North Fairfax
North Georgia
East Georgia
West Georgia
Fletcher
Fairfax
South Hero
Milton
Westford
Cambridge
Mallets Bay
Colchester
Burlington
Winooski
Essex
Essex Jc.
Pleasant Valley
Underhill
Jericho
Jericho Centre
Williston
S. Burlington
Shelburne
Shelburne Pd.
Richmond
Jonesville
Bolton
Hinesburg
Charlotte
E. Charlotte
Huntington
N. Ferrisburgh
Monkton
Starksborough
Ferrisburgh
Vergennes
S. Starksborough
Panton
Waltham
New Haven
Bristol
Lincoln
Addison
Weybridge
Brooksville
Middlebury
E. Middlebury
Bridport
Cornwall
Ripton
Salisbury
L. Dunmore
Leicester
Shoreham
Whiting
Larrabee's Pt.
Orwell
Chipman's Landing
Sudbury
Brandon
Benson Landing
Benson
Hubbardton
Pittsford
Sutherland Falls
Lake Bomoseen
West Haven
Hydeville
Castleton
Fair Haven
Poultney
Clarendon Springs
Ira
E. Poultney
Wells
Middletown Sprs.
Tinmouth
S. Wallingford
Wallingford
E. Wallingford
Mt. Holly
Mt. Tabor
Pawlet
Danby
Rutland
Killington Pk.
Pico Mt.
Mendon
Chittenden
N. Chittenden
Pittsfield
Rochester
Clarendon
Shrewsbury
Belvidere
Waterville
Eden Mills
Eden
Johnson
N. Hyde Park
Hyde Park
Jeffersonville
Morristown
Morrisville
Elmore
E. Elmore
Mansfield Mt.
Stowe
Wolcott
E. Hardwick
Hardwick
Albany
E. Albany
Irasburgh
Lowell
Brownington
Barton Landing
Barton
Crystal L.
Glover
Westmore
Willoughby Pond
Island Pond
E. Charleston
E. Brighton
Bloomfield
Nulhegan
Brunswick
Maidstone
Guildhall
Newark
W. Burke
Burke
E. Haven
Sutton
Wheelock
N. Craftsbury
Craftsbury
Caspian L.
Sheffield
Greensborough
Stannard
Walden
Lyndon
Lyndonville
Granby
Victory
Kirby
Lunenburg
Miles Pond
Lancaster
St. Johnsbury
Danville
W. Danville
Joes Pd.
W. Concord
Concord
Lower Waterford
Waterford
Whitefield
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Peacham
McLenans
Barnet
McIndoes Falls
Ryegate
Groton
Wells River Pd.
Wing Road
Fabyan Ho.
Profile Ho.
Woodbury
Cabot
E. Calais
Calais
Marshfield
Worcester
Middlesex
Waterbury
Waterbury Cen.
N. Duxbury
Moretown
MONTPELIER
E. Montpelier
Plainfield
Berlin
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Fayston
Waitsfield
Warren
Roxbury
Northfield
Williamstown
S. Northfield
Brookfield
E. Granville
Granville
Braintree
W. Braintree
Hancock
Orange
Topsham
Washington
Wells River
Newbury
E. Corinth
Corinth
Haverhill
Chelsea
Randolph
W. Randolph
Vershire
Ely
W. Fairlee
Fairlee
Fairlee L.
Bradford
Tunbridge
Strafford
S. Strafford
Thetford
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Union Vil.
Bethel
Royalton
S. Royalton
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Gaysville
Sharon
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Hartford
W. Hartford
Barnard
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Quechee
Taftsville
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White River Junc.
Sherburne
Bridgewater
Plymouth
N. Hartland
Hartland
Reading
W. Windsor
Windsor
Ascutney Mt.
Ascutneyville
Headville
Cavendish
Ludlow
Proctorsville
Weathersfield
Gassett Station
Weston
Andover
Springfield
Chester
Bartonsville
Londonderry
Windham
Grafton
Rockingham
Saxtons River
Athens
Bellows Falls
Westminster
Townshend
Brookline
Jamaica
Winhall
Stratton
Wardsborough
Newfane
Putney
E. Putney
Dover
W. Dover
Somerset
Dummerston
Wilmington
Searsburg
Brattleborough
Marlborough
Guilford
Whitingham
Halifax
Vernon
S. Vernon
N. Dorset
Rupert
Dorset
W. Rupert
E. Dorset
Peru
Factory Pt.
Sandgate
Mt. Equinox
Manchester
Sunderland
W. Arlington
Arlington
E. Arlington
Glastonbury
Shaftsbury
N. Bennington
Bennington
Woodford
N. Pownal
Pownal
Readsborough
Stamford
Keene
Wentworth
Campton
Plymouth
Danbury
Laconia
E. Tilton
Newport
Contoocook
CONCORD
Manchester
Nashua
Connecticut R.
Winooski R.
Lamoille R.
Missisquoi R.
White R.
Otter Creek
Black R.
Williams R.
West R.
Deerfield R.
Batten Kill R.
Poultney R.
Lewis Cr.
Waits R.
Wells R.
Ompompanoosuc R.
Ottauquechee R.
Passumpsic R.
Moose R.
Clyde R.
Nulhegan R.
Lower Ammonoosuc R.
Mascoma R.
Pemigewasset R.
Merrimac R.
Contoocook R.
Hoosic R.
Second Br.
Third Br.
Scale of Miles
0 5 10 15 20 25 30 35
County Towns ◉
Railroads
This type indicates a population of 2,000 or over.

to the people; but this being defeated, he voted for his execution without delay, and as president pronounced the sentence. From this time until the downfall and arrest of the Girondists (May 31 and June 2, 1793), of whom he was the most eloquent leader, he was engaged in a continual struggle against Robespierre and the ultra-revolutionists (*montagnards*). He appeared with his friends before the revolutionary tribunal, Oct. 24, and made a bold and eloquent defence, but with his colleagues was sentenced to death, Oct. 30. His most important speeches are contained in *Choix de rapports, opinions et discours* (Paris, 1818–'25).—See *Histoire parlementaire et vie intime de Vergniaud*, by Touchard-Lafosse (1848).

VERIA, or **Verria** (anc. *Berœa*), a town of European Turkey, in Macedonia, on a tributary of the Vistritza (anc. *Haliacmon*), 38 m. W. S. W. of Salonica; pop. about 10,000. It is one of the most agreeable towns in Macedonia, and contains considerable remains of antiquity. The vicinity abounds in fruits, and cotton weaving, dyeing, and carpet manufactories are carried on.—St. Paul and Silas withdrew to ancient Berœa from Thessalonica. The apostle preached the gospel here, and Sopater, a native of the place, accompanied him to Asia.

VERMICELLI. See MACARONI.

VERMIGLI, Pietro Martire, commonly called PETER MARTYR, an Italian reformer, born in Florence, Sept. 8, 1500, died in Zürich, Nov. 12, 1562. At an early age he entered the order of regular canons of St. Augustine, and by his learning and eloquence became famous throughout Italy. Intercourse with a Protestant convert at Naples, and the writings of Bucer, Zwingli, and Melanchthon, induced him to adopt their doctrines. His opinions becoming known while he was prior at Lucca, he was in 1542 compelled to fly to Switzerland, and was soon after made professor of divinity at Strasburg. In 1547 he went to England on the invitation of Cranmer, and was appointed by Edward VI. lecturer upon the Holy Scriptures at Oxford. On the accession of Queen Mary he resumed his chair at Strasburg, and also lectured on Aristotelian philosophy till 1556, when he became professor of theology at Zürich. He was present at the celebrated conference of Poissy in 1561. Peter Martyr was one of the most learned men of the Reformed church, and was the author of many works, among which were epistles to "his Brethren of the Protestant Church of Lucca," to the Protestant churches in Poland, to Calvin, Bullinger, Beza, Melanchthon, Queen Elizabeth, and others, commentaries on various parts of the Scriptures, and works on Christian ethics. Several of his works in Latin and English were printed in the 16th century in England, the last in 1583, dedicated to Queen Elizabeth, as "The Commonplaces of the most famous and renowned Divine Doctor Peter Martyr, divided into four principal Parts by Anthony Marten."

VERMILION. See CINNABAR.

VERMILION, or Vermillion. I. A S. W. parish of Louisiana, bordering on the gulf of Mexico, and intersected by Vermilion river; area, about 1,400 sq. m.; pop. in 1870, 4,528, of whom 1,047 were colored; in 1875, 6,697, of whom 1,551 were colored. The surface is level prairie, and in many places marshy. Vermilion river, flowing into Vermilion bay in this parish, is navigable for steamboats. The chief productions in 1870 were 111,995 bushels of Indian corn, 22,087 of sweet potatoes, 969 bales of cotton, 259 hogsheads of sugar, 10,165 gallons of molasses, and 421,501 lbs. of rice. There were 2,056 horses, 3,183 milch cows, 12,029 other cattle, 1,502 sheep, and 3,595 swine; 4 manufactories of carriages and wagons, and 8 of molasses and sugar. Capital, Abbeville. **II.** A W. county of Indiana, bordering on Illinois, bounded E. by the Wabash and intersected by Vermilion river; area, 290 sq. m.; pop. in 1870, 10,840. The surface is generally level, and the soil highly fertile, a large portion of the county consisting of beautiful prairie land. Iron ore and bituminous coal abound. The Evansville, Terre Haute, and Chicago railroad traverses it. The chief productions in 1870 were 261,246 bushels of wheat, 598,322 of Indian corn, 54,257 of oats, 33,167 of potatoes, 145,253 lbs. of butter, 44,595 of wool, and 9,659 tons of hay. There were 3,551 horses, 2,278 milch cows, 4,902 other cattle, 13,552 sheep, and 14,047 swine; 1 pork-packing establishment, 5 flour mills, 3 saw mills, and 2 woollen mills. Capital, Newport. **III.** An E. county of Illinois, bordering on Indiana, drained by Vermilion and Little Vermilion rivers and their affluents, and traversed by several railroads; area, about 1,200 sq. m.; pop. in 1870, 30,388. The surface is level, and the soil very fertile. Bituminous coal is found along the banks of Vermilion river. The chief productions in 1870 were 294,364 bushels of wheat, 52,479 of rye, 2,818,027 of Indian corn, 436,051 of oats, 172,558 of potatoes, 632,624 lbs. of butter, 278,554 of wool, and 52,553 tons of hay. There were 15,282 horses, 1,122 mules and asses, 9,681 milch cows, 24,078 other cattle, 67,890 sheep, and 50,177 swine; 17 manufactories of carriages and wagons, 5 of furniture, 1 of iron castings, 1 of machinery, 9 flour mills, and 2 woollen mills. Capital, Danville.

VERMONT, so called from its principal range of mountains (Fr. *verd* or *vert*, green, and *mont*, mountain), one of the New England states of the American Union, and the first admitted under the federal constitution. It lies between lat. 42° 44′ and 45° 3′ N., and lon. 71° 38′ and 73° 25′ W., and is bounded N. by Canada, E. by New Hampshire, S. by Massachusetts, and W. by New York and Lake Champlain, of which nearly two thirds lies within the state; area, 10,212 sq. m. It is divided into 14 counties, viz.: Addison, Bennington, Caledonia, Chittenden, Essex, Franklin, Grand Isle, Lamoille, Orange, Orleans, Rutland, Washington, Windham, and Windsor. There are only two incorporated cities in the state: Burlington, which in 1870 had 14,387 inhabitants, and Vergennes, with a population of 1,570. The capital, Montpelier, had in 1870 a population of 3,023. There are 241 towns, the most important of which are Bennington, Brandon, Brattleboro, Castleton, Colchester, Fairhaven, Middlebury, Northfield, Rockingham, Rutland, St. Albans, St. Johnsbury, Springfield, Waterbury, Windsor, and Woodstock. The population of the state, according to the decennial censuses, has been as follows:

State Seal of Vermont.

YEARS.	White.	Colored.	Total.	Rank.
1790	85,154	271	85,425	12
1800	153,908	557	154,465	13
1810	217,145	750	217,895	15
1820	235,063	903	235,966	16
1830	279,771	881	280,652	17
1840	291,218	730	291,948	21
1850	313,402	718	314,120	23
1860	314,369	709	315,098	28
1870	329,613	924	330,551	30

Included in the total of 1870 are 23 Indians, and 20 in that of 1860. Of the total population in 1870, 165,721 were males and 164,830 females; 283,396 were native and 47,155 foreign born. Of those of native birth, 243,272 were born in the state, 9,202 in Massachusetts, 13,540 in New Hampshire, and 11,297 in New York. Of the foreigners, 28,544 were born in British America, 1,946 in England, 14,080 in Ireland, and 1,240 in Scotland. The density of population was 32·37 persons to a square mile. There were 70,462 families, with an average of 4·69 persons to each, and 66,145 dwellings, with an average of 5 to each. Between 1860 and 1870 there was an increase of 4·90 per cent. in the total population. There were 89,831 persons from 5 to 18 years of age, 62,459 males from 18 to 45, and 74,867 male citizens 21 years old and upward. There were 15,185 persons 10 years of age and over unable to read, and 17,706 who could not write, of whom 13,804 were foreign born. The number of illiterates 21 years old and over was 13,394. The number of paupers supported during the year ending June 1, 1870, was 2,008, at a cost of $178,628. Of the number (1,785) receiving support at that date, 523 were foreigners. The number of persons convicted of crime during the year was 139, and there were 193 in prison at the close of the year. The state contained 189 blind, 148 deaf and dumb, 721 insane, and 325 idiotic. Of the total population (258,751) 10 years of age and over, there were engaged in all occupations 108,763; in agriculture 57,983, of whom 23,692 were laborers and 34,144 farmers; in professional and personal services, 21,032, including 591 clergymen, 9,588 domestic servants, 6,426 laborers, 72 lawyers, 569 physicians and surgeons, and 1,895 teachers; in trade and transportation, 7,132; and in manufactures and mechanical and mining industries, 22,616. The total number of deaths was 3,545, or 1·07 per cent. of the population. There were 715 deaths from consumption, there being 5 deaths from all causes to one from that disease; from pneumonia, 225 deaths, or 15·8 deaths from all causes to one from that disease; cholera infantum, 105; diphtheria and scarlet fever, 115; enteric fever, 221; dysentery, 103.—The surface of the state is greatly diversified by hills and valleys, gentle acclivities, elevated plateaus, and mountains of considerable height. The Green mountain range extends through the state from its S. line in a northerly direction to the vicinity of lat. 44°, where it divides into two chains, one of which continues N. by E. to the Canada line, while the other turning N. E. extends to the New Hampshire line, where it joins that of Canada. (See GREEN MOUNTAINS.) These mountains are not generally granitic, and their rounded grassy summits offer a striking contrast to the lofty, bare, and jagged peaks of the White mountains. There are considerable quantities of cultivated land at an elevation of 2,000 to 2,500 ft. above tide water.—The E. part of the state is drained by the affluents of the Connecticut; the most important of these are the Passumpsic, Wells, White, Black, West, and Deerfield rivers, the last named lying chiefly in Massachusetts. The Connecticut itself, forming the entire boundary line between Vermont and New Hampshire, belongs wholly to the latter state. The streams on the W. side of the state discharge their waters into Lake Champlain; the most important are Otter creek, Winooski or Onion river, a beautiful stream with abundant water power, and the Lamoille and Missisquoi rivers. Two or three small streams fall into Lake Memphremagog on the Canada border, the S. part of which is in the state. There are numerous small lakes, the principal of which are Lakes Willoughby, Maidstone, Seymour, Dunmore, Austin, and Bombazine. Long pond, or as it is now commonly called "Runaway pond," was formerly situated between two hills on the height of land dividing the watershed in the towns of Glover and Greensborough, and was one of the sources of the Lamoille river. In June, 1810, an attempt was made to open an outlet from it to Barton river on the north, when all the water of the pond, which was 1½ m. long and ½ m. wide, tore its way through the quicksand, which was only separated by a thin stratum of clay from the pond, and advanced in a wall from 60 to 70 ft. high and 20 rods wide, carrying everything before it, reaching Lake Memphremagog, 27 m. distant, in about six hours. There are several islands in Lake Champlain and one or two in Lake Memphremagog belonging to the state; the largest are North and South Hero and Isle la Motte in Lake Champlain, which with the peninsula of Alburg constitute Grand Isle co. The only considerable harbor is that of Burlington, on Lake Champlain.—The geological formations of Vermont consist chiefly of the lower groups of the geological column comprised in the azoic and Silurian divisions. The Devonian formation is represented by a band of limestone about a mile wide and 20 or 30 m. long on the E. side of the Green mountains. The drift formation overspreads the whole state, and alluvial deposits of limited extent are met with along the banks of the rivers. The lower formations are all of uncertain age, owing to the metamorphic character of the rocks, their doubtful stratigraphical relations, and their dearth of fossils. Their determination has been an interesting subject of investigation. The Green mountain range is composed chiefly of gneiss, which may be the oldest rock in Vermont, or may prove to be of Silurian or Devonian age, or both in a metamorphic condition. Should this prove to be anticlinal, the group will then pass on each side under rocks of later age; but if its structure is synclinal, it then overlies the rocks on either side; so far it has been found impracticable to determine this question. Along the W. base of the Green mountains extends a great belt of quartz rock, which in the opinion of the surveyors rests upon the gneiss, and which has been supposed to be the equivalent of the Potsdam sandstone, though now regarded by the Vermont surveyors as of the age of the Medina sandstone of the Clinton group of New York. Apparently overlying this is a great bed of crystalline limestone 2,000 ft. thick called the Eolian limestone, from Mt. Eolus in the S. W. part of the state. This has been generally referred to the lower Silurian group, but its true position in the geological series is very doubtful. The rock constitutes the principal portion of several ranges of mountains in the S. part of the state. Along Lake Champlain the rocks are lower Silurian and primordial, slates found in the town of Georgia being referred to the latter system on the evidence of trilobites discovered in them. The Laurentian group is represented in a small exposure near Whitehall at the S. extremity of Lake Champlain.—Various mineral productions of value are found in connection with the ancient formations of this state. The talcose slates and quartz rocks, as throughout the whole range of the Appalachian chain, present numerous deposits of hematite iron ore. The same formation has also furnished productive mines of manganese at Chittenden; and at Plymouth and several other places it has produced gold. Lead ores, more or less argentiferous, have been found at several localities along this range, but have not proved profitable. At Vershire and Corinth, Orange co., is a large vein of pyritous copper ore. In the serpentine rocks about Troy, in the extreme north, chromic iron has been met with in considerable quantity. Excellent clay for white stone ware has been worked for the pottery at Bennington, and beds of soapstone are found in many towns along the central N. and S. line of the state. Vermont is rich in marble and slate. Marble was first quarried at Rutland in 1844, and the quarries there now supply about half of the production of Vermont. The marbles obtained are the white statuary and the variegated, mottled, and blue. The proportion of white is larger than in any other part of the state; it is not inferior to the best Italian. The Sutherland Falls and East Dorset quarries produce marble resembling the veined Italian. The Swanton and Isle la Motte marble when polished is jet black. The Lake Champlain quarries produce marble resembling brocatella. Winooski yields fine Siena and other grades of pale red and white. There are valuable slate quarries in Rutland, Washington, and Windham counties. The first quarry was opened at Fairhaven, Rutland co., in 1845. For many years the production was inconsiderable; but this industry has now become important in consequence of the increased demand for roofing slates, floors, tiles, &c. In 1875 the production was valued at $370,000, being chiefly from the Fairhaven quarries.—The state abounds in beautiful waterfalls and other natural curiosities. The most remarkable, besides Bellows falls in the Connecticut, adjoining a village of the same name in the town of Rockingham, but belonging to New Hampshire, are the "Great falls" on the Lamoille in Milton; the McConnel's falls, and the natural bridge a little below them, in Johnson; the "Great falls" on the Clyde in Charleston, where there is a descent of 100 ft. in 40 rods; the numerous falls on the Winooski, with its natural bridge and caverns in Duxbury; the magnificent fall of 70 ft. in the Missisquoi at Troy, and the gentler one at Highgate; the falls in the Passumpsic at Lyndon; the falls in the Black river at Springfield; and the caves at Dorset and Plymouth.—The climate of Vermont is severe, and the winters are cold; but there are not many sudden changes, and the state is remarkably healthful. Observations at Lunenburg (lat. 44° 28′, lon. 71° 41′, elevation 1,210 ft.) show the following average means for 25 years: January, 16·54°; February, 17·38°; March, 26°; April, 37·86°; May, 52·18°; June, 65·05°; July, 68·39°; August, 65·82°; September, 56·31°; October, 44·51°; November, 31·38°; December, 19·14°; year, 41·72°; annual rainfall and melted snow, 41·11 inches; snow, 83·1 inches.—The soil is generally a rich loam, most fertile where the underlying rock is limestone. The forest trees are hemlock, fir, and spruce on the mountains, oak, beech, sugar maple, pine, hickory, elm, butternut, basswood, and birch on the lower lands, and cedar in the swamps. The mountains are generally covered with timber or afford good pasturage, and the proportion of unimprovable land is smaller than in some less mountainous states. As a large proportion of the land is better adapted to grazing than to tillage, much attention has been given to the raising of live stock, and the horses, cattle, sheep, and swine of Vermont are of excellent quality. The wild animals are the panther, wild cat, lynx, raccoon, wolf, fox, moose (found only in the extreme north of the state, and scarce even there), elk, deer, black bear, and rabbits and squirrels of several species. The birds are those of New England generally, but the northern aquatic birds appear in large numbers and early in the season on Lake Champlain. The lake yields large quantities and numerous varieties of fish. The muscalonge is the largest, and the lake white fish, salmon trout, pickerel, roach, perch, and other smaller fish are abundant. The proteus, an uncommon reptile in northern waters, is found there in considerable numbers. The rattlesnake, the black snake, two or three species of adder, and the harmless species of serpents are not infrequent.—In 1870 the number of acres of improved land in farms was 3,073,257; woodland, 1,386,934; other unimproved land, 68,613; percentage of improved land in farms to total land in farms, 32·1. The total number of farms was 33,827, the average size being 134 acres. There were 1,719 farms containing from 3 to 10 acres, 1,998 from 10 to 20, 6,210 from 20 to 50, 10,761 from 50 to 100, 12,934 from 100 to 500, 102 from 500 to 1,000, and 15 of over 1,000 acres. The cash value of farms was $139,367,075; of farming implements and machinery, $5,250,279; total estimated value of all farm productions, including betterments and additions to stock, $34,647,027. According to the United States department of agriculture, the chief productions in 1873 were as follows:

CROPS.	Quantity produced.	No. of acres in each crop.	Average yield per acre.	Total value.
Indian corn, bush.	1,748,000	56,387	31	$1,485,800
Wheat	399,000	24,937	16	666,330
Rye	60,000	8,727	16·1	57,000
Oats	3,579,000	109,785	32·6	1,753,710
Barley	97,000	4,075	23·8	83,420
Buckwheat	365,000	17,807	20·5	262,800
Potatoes	5,088,000	36,343	140	2,238,720
Tobacco, lbs	350,000	275	1,272	70,000
Hay, tons	893,200	812,000	1·1	11,951,016
Total	....	1,065,336	.....	$18,568,796

The number and value of farm animals were as follows:

ANIMALS.	Number.	Average price.	Total value.
Horses	71,000	$85 20	$6,049,200
Oxen and other cattle	128,000	32 88	4,208,640
Milch cows	195,700	35 50	6,947,350
Sheep	543,600	3 59	1,951,524
Hogs	53,500	9 59	513,065

In 1870 the production of hay was 1,020,669 tons; wool, 3,102,137 lbs.; potatoes, 5,157,524 bushels; butter, 17,844,396 lbs.; cheese (on farms), 4,830,700 lbs.; hops, 527,927 lbs.; maple sugar, 8,894,302 lbs.; maple molasses, 12,023 gallons; honey, 142,932 lbs. In the production of these articles Vermont holds a high rank among the states of the Union.—Practical measures have been taken by the state for the promotion of pisciculture. This industry is under the supervision of two commissioners, who have deposited large numbers of shad, salmon, and other varieties of fish in the waters of the state. There are in the state 145 natural ponds of 50 acres and upward, covering in the aggregate 77,315 acres. These are now inhabited by varieties of fish almost worthless, such as pickerel, bream (sunfish), suckers, and dace; it is proposed to stock them with trout, salmon, whitefish, &c. The total number of manufacturing establishments in 1870 was 3,270, having 186 steam engines of 6,425 horse power and 1,984 water wheels of 44,897 horse power, and employing 18,686 hands, of whom 16,301 were males above 16 years of age, 1,872 females above 15, and 513 youth. The capital invested amounted to $20,329,637; wages paid during the year, $6,264,581; value of materials used, $17,007,769; of products, $32,184,606. The leading establishments were as follows:

INDUSTRIES.	No. of establishments.	Hands employed.	Capital.	Value of products.
Agricultural implements	45	372	$518,150	$523,669
Blacksmithing	385	759	273,665	566,189
Boots and shoes	212	751	281,679	838,325
Carriages and wagons	162	616	465,670	620,207
Cars, freight and passenger	2	250	175,000	452,470
Cheese	28	92	107,700	445,323
Cotton goods, not specified	8	451	670,000	546,510
Flouring and grist-mill products	220	500	1,231,050	3,895,058
Furniture, not specified	47	413	439,175	540,521
" chairs	33	323	262,000	355,085
Leather, tanned	86	321	620,743	1,249,942
" curried	64	137	156,390	762,571
" dressed skins	5	17	60,000	40,400
Lumber, planed	19	1,342	2,007,600	2,544,603
" sawed	637	2,782	2,872,451	3,525,122
Machinery	48	678	1,054,058	1,122,567
Musical instruments	2	204	302,000	348,999
Sash, doors, and blinds	43	331	286,900	518,125
Scales and balances	2	363	280,000	1,629,000
Tin, copper, and sheet-iron ware	97	339	358,150	505,005
Woollen goods	43	1,892	2,297,500	3,550,962

Besides the above, there were 54 mining and quarrying establishments, employing 906 hands;

capital invested, $2,494,700; value of products, $905,410. The production of copper in 1870 was valued at $358,845, of marble at $130,800, and of slate at $361,765. The production of marble in 1875 was as follows:

CHARACTER OF MARBLE AND WHERE PRODUCED.	Feet.	Cash value.
Rutland statuary, white, variegated, mottled, and blue	2,000,000	$1,000,000
Sutherland Falls and East Dorset, imitation Italian	850,000	300,000
Dorset, less valuable	1,000,000	300,000
Brandon, Isle la Motte, Swanton, and other marble	550,000	275,000
Total	4,400,000	$1,875,000

A considerable foreign commerce is carried on with Canada through Burlington, which is the port of entry of the United States customs district of Vermont. The value of imports for the year ending June 30, 1875, was $2,631,748; of exports, $2,496,830. There were entered in the foreign trade 728 vessels of 97,778 tons; cleared, 690 vessels of 95,120 tons. The total number of vessels registered, enrolled, and licensed was 23, of 4,631 tons.—In 1850 there were but two railroads in Vermont: the Champlain and Connecticut River (now the Rutland), extending from Bellows Falls to Burlington by way of Rutland, and the Vermont Central, from the Connecticut river, in the town of Windsor, to Burlington. The former was opened for travel in December, 1849, and the latter in January, 1850. The total extent of railroads in the state amounted to 554 m. in 1860, 614 m. in 1870, and 765 m. in 1876. About $35,000,000 has been expended in the construction of railroads in the state, besides the equipment of the roads and other personal property, which make the aggregate about $50,000,000. Nearly the whole of this amount is exempt from taxation. The railroads lying wholly or partly in the state in 1876, with their lengths and termini, were as follows:

NAME OF CORPORATION.	TERMINI.		LENGTH.	
	FROM	TO	Total.	In Vermont.
Addison	Leicester	Ticonderoga, N. Y	16	16
Atlantic and St. Lawrence	Portland, Me.	Island Pond	149	15
Connecticut and Passumpsic and Massawippi	White River Junction	Sherbrooke, Canada	145	110
Harlem Extension	Rutland	Chatham Four Corners, N. Y.	113	63
Missisquoi	St. Albans	Richford	30	30
Montpelier and Wells River	Montpelier	Wells River	38	38
Montpelier and White River	Montpelier	Barre	6	6
Portland and Ogdensburg (Vermont division)	Lunenburg	Johnson	77	77*
Rensselaer and Saratoga	Troy, N. Y	Rutland	95	26
Branch	Eagle Bridge, N. Y	Castleton	61	17
Rutland	Bellows Falls	Burlington	120	120
Missisquoi and Clyde River	Newport	West Farnham, Canada	65	22
Vermont and Canada	Essex Junction	Rouse's Point, N. Y	59	59†
Vermont and Massachusetts	Miller's Falls, Mass.	Brattleboro	21	10
Vermont Central	Windsor	Burlington	117	117
Vermont Valley	Bellows Falls	Brattleboro	24	24
Woodstock	White River Junction	Woodstock	15	15

The Addison, Harlem Extension, Missisquoi, Rutland, Vermont and Canada, Vermont and Massachusetts, Vermont Central, and Vermont Valley are all operated by the Central Vermont railroad company.—On Nov. 1, 1875, there were in the state 46 national banks, with a paid-in capital of $8,945,390; circulation issued, $13,702,250; outstanding, $7,178,581; 20 savings banks, with 27,677 depositors and deposits amounting to $7,590,599; and 6 fire and 3 life insurance companies incorporated by Vermont.—The legislative power is vested in a general assembly, consisting of a senate of 30 members and a house of 241 representatives, one from each town. The sessions of the general assembly are biennial, beginning on the first Wednesday of October in even years. Each of the 14 counties is entitled to one senator at least, and the remainder of the senators are apportioned among the several counties according to the population as returned by the latest federal census. Senators and representatives are chosen for two years, and receive $3 a day each during the session. The chief executive officers are the governor (annual salary, $1,000), lieutenant governor, who acts as president of the senate and receives $6 a day during the session, secretary of state, treasurer, auditor, and superintendent of education, who each receive $1,500 a year. The governor's power of appointment is very limited, usually extending merely to his secretary and military staff; but he may fill a vacancy until the office is provided for in the manner prescribed by law. He is empowered to nominate, subject to approval by the senate, six members of the state board of agriculture, manufactures, and mining. The governor, lieutenant governor, and treasurer are elected for two years by the freemen of the state; the secretary of state, auditor, and superintendent of education are chosen by the legislature. The other state officers comprise an inspector of finance, savings banks, and trust companies, a railroad commissioner, a commissioner of the insane, two commissioners of insurance and two of fisheries, a superintendent of the state prison, a superintendent of the reform

* To be completed to Swanton, 118 m.
† Including Swanton branch to Canada line, 10 m.

school, a state librarian, a geologist and curator of the state cabinet, an adjutant and inspector general, a quartermaster general, a judge advocate general, and a surgeon general. The supreme court comprises a chief and six associate justices, each of whom receives an annual salary of $2,500. A general session of the court is held annually at Montpelier, and annual sessions are held in each county. County courts are held by a judge of the supreme court with the two assistant county judges. United States courts are held in Burlington, Windsor, and Rutland. Judges of the supreme court are chosen for two years by joint ballot of the legislature. County and probate judges, sheriffs, state attorneys, and high bailiffs are elected for two years by the freemen of the counties, and justices of the peace by the freemen of the towns for the same term. The general election for state officers and members of the legislature is held biennially, on the first Tuesday of September in even years. Every man of the age of 21 years, who is a natural-born or naturalized citizen of the United States and has resided for one year in the state, and is of quiet and peaceable behavior, becomes entitled to the privileges of a freeman upon oath or affirmation that in voting he will, according to his judgment, aim to promote the good of the state. Town meetings are held in March of each year. For the rights of married women concerning their property and earnings, see HUSBAND AND WIFE, vol. ix., p. 87. For the grounds of divorce, see DIVORCE, vol. vi., p. 160. Vermont is represented in congress by two senators and three representatives, and has therefore five votes in the electoral college. The total liabilities of the state on Aug. 1, 1875, amounted to $328,584, including the funded debt of $167,500, of which $102,000 will fall due on Dec. 1, 1876, and $65,500 on Dec. 1, 1878; the agricultural college fund of $135,500; due to towns from the United States surplus fund, $11,520; soldiers' accounts, $12,178; outstanding checks, $1,886. The resources were $324,940, including $320,377 cash in treasury and in banks, and $4,563 taxes due from 11 towns. Exclusive of the sinking fund account, the receipts into the treasury during the year ending July 31, 1875, were $500,656, and the disbursements $510,230. The valuation of real estate in 1875 was $81,106,760, which is about 40 per cent. of the real value, estimated at $200,000,000. The grand list of the state is 1 per cent. of the valuation. In 1872 the state tax was 40 per cent. on the grand list of $1,171,619; in 1873 it was 35 per cent. on the grand list of $1,175,476. Adding the tax on gores and unorganized towns, and deducting for abatements and collection fees, the amount of the tax was $448,408 in 1872, and $393,660 in 1873. According to the federal census of 1870, the assessed value of property was $102,548,528, including real estate returned at $80,993,100 and personal at $21,555,428. The true valuation of real and personal estate was returned at $235,349,553. —The state asylum for the insane, opened in 1836, is at Brattleboro, on a beautiful site of 20 acres. It has accommodations for from 450 to 500 patients. During the two years ending Aug. 1, 1874, the total number of inmates was 699, of whom 245 were state beneficiaries; average number, 473; discharged, 172, of whom 48 were recovered, 87 improved, and 37 stationary; died, 37; remaining, Aug. 1, 1874, 471, of whom 163 were state beneficiaries. The expenses of the institution during the two years amounted to $213,929, of which $56,214 was for building account, and $14,210 for repairs and improvements. The institution is subject to the inspection of the state commissioner of the insane. The state prison at Windsor had during the two years ending Aug. 1, 1874, 151 convicts, of whom 85 were in confinement at the end of that period. The income of the prisons for the two years, chiefly from the labor of convicts, was $28,331; the expenses were $25,081. The convicts are employed in the prison in making shoes; their labor is let to contractors at 70 cents a day for each prisoner. The state reform school was opened at Waterbury in 1866, and removed to Vergennes in 1875. Boys under 16 years of age are committed by courts, parents, and guardians; they receive instruction, and are employed in industrial occupations. The whole number of inmates from the opening to Aug. 1, 1874, was 416, of whom 145 were remaining at that date. The current expenses of the institution were $20,088 in 1872, and $21,843 in 1873. The average annual expense of each boy to the state, after deducting earnings, was $85 27. Vermont has no institution for the deaf and dumb, or the blind; but an annual appropriation not exceeding $5,000 is authorized for the instruction of the deaf and dumb in institutions of other states, and not exceeding $4,000 for the benefit of the blind.—In 1874 the board of education was abolished and the supervision of common schools vested in a state superintendent of education, who is elected biennially by the legislature and receives an annual salary of $1,500 and travelling expenses. Among other things, he is required, upon written application of 25 teachers in any county (except Grand Isle and Essex counties, in which the number may be 15), to hold a teachers' institute once a year. In each town a superintendent is elected by the people annually. It is his duty to hold two annual examinations of teachers, and to grant certificates. Principals of graded and union schools are not required to obtain such certificates. The town superintendent is required to visit at least once a year all the common schools of the town, and to make an annual report to the state superintendent, who reports biennially to the legislature. Each organized town must maintain one or more schools; when necessary, the town must be divided into school districts unless it has abolished the district system. The school officers of each district are a moderator to preside in the meetings, clerk, collector of taxes, treasurer, one or three auditors, and a prudential committee consisting of one or three voters in such district; they are elected by the people. By act of 1870 towns are authorized to abolish the district system, and to vest the management of the public schools in six directors elected by the people for three years, one third each year. The law of 1872 authorizes towns that have abolished the district system to return to it. Vermont has no school fund, the schools being supported by direct taxation levied by the towns. Under the act of 1867 every child between 8 and 14 years of age is required to attend a public school at least three months in the year, unless he has been otherwise instructed for a like period, or has acquired the branches of learning taught in the public schools. No child of this age who has resided in the state one year shall be employed in any mill or factory unless he has attended a public school three months within the year next preceding. A penalty of not less than $10 nor more than $20 is imposed upon every parent, guardian, or employer violating the provisions of this act. The condition of public education in 1873 and 1874 is shown by the following statistics:

PARTICULARS.	1873.	1874.
Number of organized school districts.	2,168	2,224
" of fractional districts........	487	530
" of common schools..........	2,637	2,782
" of academic and private schools..................	100	96
Children between 5 and 20 years of age	83.485	87.541
" attending common schools..	88,706	70,918
" attending all schools........	94,696	78,139
Average daily attendance in all schools	17	18
Average length of school year (weeks)	23·5	22·3
Number of male teachers	601	667
" of female teachers...........	3,513	3,739
Current expenses of schools..........	$462,635	$515,231
Total expenditures for schools........	$548,815	$621,161
Amount raised on grand list:		
By districts.....................	$382.841	$409.421
By towns........................	$86,295	$66,685
Average yearly cost of schools........	$176 43	$185 17
Average weekly cost per pupil:		
Enrolled.........................	$0 30	$0 32
Attending........................	$0 44	$0 44
Estimated cash value of school houses and grounds........................	$1,327,846	$1,339,864

In 1873–'4 teachers' institutes were held in all the counties, and were attended by 982 teachers. The state makes an annual appropriation of $1,500 for each of its three normal schools. In 1875–'6 that at Johnson had 4 instructors and 101 pupils; that at Randolph, 9 instructors and 250 pupils; and that at Castleton, 2 instructors and 75 pupils. The university of Vermont and state agricultural college, in Burlington, chartered in 1791 and opened in 1800, has an academical, an agricultural and scientific, and a medical department. The course of instruction in each of the first two departments occupies four years. In the agricultural and scientific department there are courses in agriculture and related branches, theoretical and applied chemistry, civil engineering, and metallurgy and mining engineering. Besides the usual academic degrees, the degrees of bachelor of philosophy, civil engineer, and mining engineer are conferred. All the courses in the academic and scientific departments are open to young women. In 1875–'6 there were 25 instructors, of whom 17 were in the medical school, and 153 students, of whom 62 were in the medical school. The university has a library of 16,000 volumes, a valuable museum, and the nucleus of a gallery of art. Middlebury college (Congregational), at Middlebury, was opened in 1800, and in 1875–'6 had 8 instructors, 53 students, a library of 18,000 volumes, and a valuable cabinet of natural history. Norwich university is a military college under the patronage of the Episcopalians, at Northfield. It was opened in 1834, and in 1875–'6 had 6 instructors and 41 students. Other prominent institutions of learning are the Vermont Episcopal institute in Burlington, the Vermont conference seminary and female college (Methodist) in Montpelier, Green Mountain seminary (Baptist) at Waterbury Centre, Goddard seminary (Universalist) at Barre, and St. Johnsbury academy at St. Johnsbury.—The total number of libraries in 1870 was 1,792, containing an aggregate of 727,263 volumes. Of these, 1,056 with 405,536 volumes were private, and 736 with 321,727 other than private, including the state library, 14,158; 82 town, city, &c., 52,368; 4 court and law, 3,023; 58 school, college, &c., 38,735; 544 Sabbath school, 182,840; 11 church, 8,517; 3 in charitable and penal institutions, 1,408; and 33 circulating, 20,678. In 1876 the state library at Montpelier had 17,000 volumes. The total number of newspapers and periodicals in 1870 was 47, having an aggregate circulation of 71,390 and issuing annually 4,055,300 copies. There were 3 daily, with a circulation of 3,190; 1 semi-weekly, 2,200; 43 weekly, 56,200; and 1 monthly, 12,000. In 1875 the total number was 68, including 6 daily, 57 weekly, and 5 monthly.—The total number of religious organizations in 1870 was 699, having 744 edifices with 270,614 sittings and property valued at $3,713,530. The denominations were:

DENOMINATIONS.	Organizations.	Edifices.	Sittings.	Property.
Baptist, regular..........	115	114	37.935	$462.200
" other............	16	16	5,310	44,500
Christian................	14	14	4.350	31,200
Congregational...........	183	183	75,925	1,054,400
Episcopal, Protestant.....	33	34	11,223	348,100
Friends..................	5	5	1,280	6,100
Methodist................	180	184	60,325	884,530
Presbyterian, regular.....	7	7	2,706	20,200
" other.......	2	2	650	5,000
Roman Catholic...........	40	40	25,000	401,500
Second Advent...........	15	15	4,450	39,000
Spiritualist..............	1	1	300	2,500
Unitarian................	4	4	1,900	53,000
Universalist.............	60	60	19,710	220,000
Unknown (union)........	24	65	19,550	141,300

—The first white settlement in what is now Vermont was made in 1724 by the erection of

Fort Dummer near the present site of Brattleboro, which was then supposed to be in Massachusetts. From this fort and from Charlestown, N. H., troops were sent against the French in the war of 1745, and the fertile lands along the upper Connecticut, the Winooski, and Otter creek attracted their attention. The tide of emigration began to set in about 1760, and between that date and 1768 138 townships had been granted within the present limits of the state by Gov. Wentworth of New Hampshire, who claimed the jurisdiction and fee of the soil by virtue of the New Hampshire charter. The country west of the Connecticut was only known at that time by the name of "New Hampshire grants." A proclamation was made by the governor of New York, Dec. 28, 1763, claiming the territory under the grants from Charles II. to the duke of York, and ordering the sheriff to make returns of the names of those who had settled W. of Connecticut river under titles derived from New Hampshire. Gov. Wentworth issued a counter proclamation, March 13, 1764, declaring those claims obsolete, and maintaining the jurisdiction of New Hampshire. New York appealed to the king, who granted to that colony jurisdiction to the Connecticut river. The New York government now attempted to eject and dispossess the settlers from their lands. These proceedings were met by organized resistance on the part of the settlers, acting under the lead of Ethan Allen, Seth Warner, and others. In 1774 Gov. Tryon of New York issued a proclamation commanding Ethan Allen, Seth Warner, Remember Baker, Robert Cochran, Peleg Sunderland, Silvanus Brown, James Breakenridge, and John Smith to surrender themselves within 30 days under pain of conviction of felony and death without benefit of clergy, and offering a bounty of £150 for the capture of Allen and £50 for each of the others. The Vermont leaders retorted by offering a reward for the apprehension of the attorney general of New York. The commencement of the revolution caused a suspension of the controversy. In 1776 the Vermont settlers petitioned the provincial congress, then in session in Philadelphia, for admission into the confederacy; but New York opposed, and they withdrew. In 1777 Vermont declared her independence, and in July of the same year again applied to be admitted into the confederacy. Congress hesitated and temporized, and the people became indignant. Meantime the British generals endeavored to induce the Vermonters to declare allegiance to Great Britain. Aware of the importance of gaining time, and avoiding the troubles which would follow a bold decision in favor of the congress which had twice repulsed them, Ira Allen and others kept the British officers inactive till the theatre of the war was changed. In 1781 congress offered to admit Vermont with a considerable curtailment of her boundaries; but the people refused to come in on such terms, and for nine years she remained outside the Union. In 1790 New York revived the old question, and offered to relinquish all claims to lands in or jurisdiction over the state on the payment of $30,000. Vermont acceded to the proposition, and on March 4, 1791, was admitted into the Union. But though not one of the confederated colonies, and having no voice in their councils, the "Green mountain boys" had distinguished themselves during the revolution in some of the hardest fought and most successful battles and expeditions. Ethan Allen and his company of 83 men took Fort Ticonderoga, May 10, 1775. Allen and Warner participated in the invasion of Canada, and the former was taken prisoner and sent to England, while the latter with his regiment protected the retreat from Quebec, and adopted the measures which led to the capitulation of the British garrison at St. John's. In the battles on Lake Champlain their obstinate resistance gained them credit; and the two battles near Bennington, which were the primary causes of Burgoyne's defeat and surrender, immortalized the Green mountain boys. After the admission of the state into the federal Union, Vermont prospered beyond most of the other states. In the war of 1812 the governor refused to call out the militia, and issued a proclamation forbidding troops to leave the state. In spite of this the "Vermont volunteers" took an active part in the battle of Plattsburgh and the naval conflict on Lake Champlain, and added to their old renown for valor. As they were not regularly organized state troops, they were not entitled to bounty or pensions, but congress subsequently granted land warrants to the survivors. In 1837, at the time of the Canadian rebellion, a considerable body of the inhabitants of northern Vermont sympathized with the insurgents, and to the number of 500 or 600 crossed into Canada. A well armed British force was despatched to drive them off, and Gen. Wool, then in command on the frontier, gave them the alternative of returning and surrendering their arms to him, or, if they persisted and were compelled to retreat into Vermont, of being shot when they came over. After some hesitation they laid down their arms and dispersed. During the civil war Vermont furnished to the federal army 35,256 troops, being equivalent to 29,052 for three years. —The original constitution was adopted in 1777, and was modelled on that of Pennsylvania. It was amended in 1786 and again in 1793. The convention of 1793 embodied their amendments in the constitution instead of promulgating them separately; and this instrument has since been known as "the constitution of Vermont adopted by the convention" of 1793. The constitution of 1777 provided for a council of censors, consisting of 13 persons, to be chosen every seven years and to hold office one year. Their duty was to inquire whether the constitution had been preserved inviolate during the last septenary (including the year of their service), and whether the legislative and executive branches of government had performed their duty as guardians of the people, or assumed to themselves or exercised other or greater powers than they were entitled to by the constitution. They were also to inquire whether the public taxes had been justly laid and collected in all parts of the commonwealth, in what manner the public moneys had been disposed of, and whether the laws had been duly executed. For these purposes they had power to send for persons, papers, and records; they had authority to pass public censures, to order impeachments, and to recommend to the legislature the repeal of such laws as should appear to them to have been passed contrary to the principles of the constitution. These powers they had for one year from the day of their election. Thirteen councils of censors were held, the first in 1785 and the last in 1869. The constitutional convention of 1870 passed amendments making the terms of the principal state officers and the sessions of the legislature biennial and abolishing the council of censors. Until 1836 Vermont had no senate. Prior to that time the legislative power was vested in a house of representatives and an executive council, consisting of the governor, lieutenant governor, and 12 councillors chosen for one year by the people. This council, which had been created by the constitution of 1777, practically exercised legislative powers coördinate with the house of representatives. The constitution as amended in 1786 provided that all bills originating in the assembly should be laid before the governor and council for their revision and concurrence, or proposals of amendment; and in case such proposals of amendment were not agreed to by the assembly, the governor and council were empowered to suspend the passing of such bills until the next session of the legislature. (See supplement.)

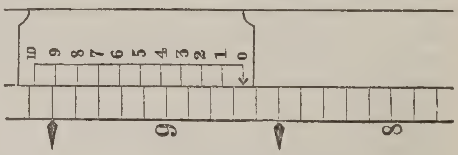
VERMONT, University of. See BURLINGTON.

VERNE, Jules, a French author, born in Nantes, Feb. 8, 1828. After studying law he wrote plays and operatic pieces, and was for some time secretary of the Théâtre Lyrique. In 1863 he became known by his *Cinq semaines dans un ballon*, a romance based upon the discoveries of modern science, and giving with a remarkable appearance of reality fanciful solutions of scientific problems. It has been translated into English, as have also his subsequent works of the same character, including "A Journey to the Centre of the Earth," "Twenty Thousand Leagues under the Sea," "From the Earth to the Moon," "Dropped from the Clouds," and "The Mysterious Island." One of his most popular works is the *Tour du monde en* 80 *jours* ("Around the World in Eighty Days"), which was dramatized in 1874, and had a great success at the Porte Saint-Martin theatre, Paris, and in the United States. He has also published with Théophile Lavallée an illustrated geography of France (1867-'8).

VERNET, the name of a family of French painters. The records of Avignon for 1669 mention André Vernet, a painter. ANTOINE, a decorative painter, two panels by whom are now in the museum of Avignon, was born there in July, 1689, and died Dec. 10, 1753. By his wife, Marie Thérèse Garnier, he had 22 children. An account of the eldest son is given below. Of the others, ANTOINE IGNACE, born June 7, 1726, went to Naples in 1746, and died there before 1775. He was an excellent painter of marine subjects, and especially of eruptions of Vesuvius. FRANÇOIS GABRIEL, born March 15, 1728, painted religious subjects. One of his pictures is in the church of St. Agricol, Avignon. ANTOINE FRANÇOIS, born March 12, 1730, a marine and landscape painter, was appointed painter of the royal buildings, and decorated the châteaux of Versailles, Fontainebleau, and Choisy. He died in Paris, Feb. 15, 1779. A daughter, AGATHE FAUSTINE, born June 25, 1723, married Honoré Guibert, an eminent sculptor, and her children and the children of her brothers mentioned above became more or less eminent as painters, sculptors, and jewellers. **I. Claude Joseph,** known as Joseph Vernet, eldest son of Antoine, born in Avignon, Aug. 14, 1714, died in Paris in December, 1789. He was first instructed by his father, then by able masters at Aix, and his rapid progress interested some wealthy patrons in Avignon, with whose assistance he was sent to Italy in 1734 to study historical painting. The vessel being overtaken by a terrible storm, he was lashed to the mast, and the scene presented to his view decided his career. After a few years he was considered the first marine painter in Europe, and from about 1739 the most distinguished men in Rome were his patrons and friends. Painting rapidly, he was yet unable to fill all his orders. In 1745 he married Virginia Parker, the daughter of an Irish emigrant, commander of the pope's galleys. He was made a member of the academy of St. Luke, and, with the exception of two visits to Marseilles in 1751 and 1752, remained for 20 years in Italy. In 1753 he returned to France, became a member of the academy of painting, and was commissioned by the king to paint the seaports of France. Travelling from port to port, he finished 15 of the 20 pictures ordered, when the breaking out of war and his disgust with a nomadic life induced him to resign the office and settle in Paris. Every crowned head in Europe became his patron, and he labored incessantly until his death. His pictures are scattered all over Europe, and most of them have been engraved. **II. Antoine Charles Horace,** known as Carle Vernet, son of the preceding, born in Bordeaux, Aug. 14, 1758, died in Paris, Nov. 28, 1836. On account of his delicate health his father kept him with himself, instructed him in painting, and allowed him great freedom. He became passionately fond of horses, and his pictures of them were considered masterpieces.

After once failing, he gained the great prize of the academy and went to Rome, but remained only a few months. He was subject to fits of melancholy bordering on insanity. Returning to France, he resumed his art, and marriage and a happy domestic life cured him of his melancholy. In 1804 he exhibited "The Battle of Marengo," which French critics regard as the commencement of the modern French school of military painting. This was followed by paintings of the principal battles of Napoleon. His smaller pictures, and especially his caricatures ridiculing the allies, were engraved in great numbers by the first artists of Paris. Throughout life he was remarkable for his industry, for his fine musical taste, and for his engaging social traits. **III. Jean Émile Horace,** known as Horace Vernet, son of the preceding, born in Paris, June 30, 1789, died there, Jan. 17, 1863. His education, both literary and artistic, was very irregular and unsystematic. His father imbued him with his own tastes for horses, military subjects, and caricatures. He was skilled in all bodily exercises. In 1807 he was made a conscript, but was released after his marriage with Mlle. Louise Pujol in 1810. Soon after he exhibited his first military painting, "The Capture of a Redoubt." In this picture he broke away from the conventional classicism of David and his school, and henceforth through life he painted military subjects so as to represent the reality presented by observation and experience. In 1811 he was appointed designer to the depot of war. At the exhibition of 1812 he gained a first medal by "The Taking of an intrenched Camp." As a sub-lieutenant of the national guard he participated in the defence of the barrier of Clichy, a painting of which he afterward executed. After the restoration of the Bourbons, the royal family gave him commissions which he executed, but at the same time during many years he continued to paint pictures and make designs of scenes in the history of the *grande armée* and of the life of Napoleon, which the court regarded as almost seditious. The "Dog of the Regiment," "Barrier of Clichy," "Soldier of Waterloo," "Death of Poniatowski," "Bivouac of Col. Moncey," and many others became immensely popular, and engravings by the first artists of Paris and the newly discovered art of lithography made them known in every cottage of France. At the exhibition of 1822 most of his paintings were refused admission on account of their Bonapartist tendency. He then opened an exhibition in his own studio, which was attended by crowds. Louis Philippe, then duke of Orleans, and Charles X., both anxious to secure the friendship of so popular an artist, patronized him. In 1826 he was made a member of the institute, and in 1828 director of the French academy in Rome. After the accession of Louis Philippe Vernet was for a time the representative of the French government at Rome. In 1833 he visited Algiers, and in 1835 returned to Paris. He visited St. Petersburg in 1836, '38, and '42, Algiers in 1837, '45, and '53, and Egypt, Syria, Palestine, and Turkey in 1839-'40. On his travels he wrote many letters, which were published by M. Durande in 1864. In 1841 Vernet published a small work *Du droit des peintres et des sculpteurs sur leurs ouvrages*, and in 1848 a *mémoire*, previously read before the institute, *Des rapports entre le costume des Hébreux et des Arabes modernes*, a subject which he had illustrated in a series of paintings, "Rebecca at the Well," "The Good Samaritan," and others. But from 1836 to his death his principal labor was devoted to painting battle pieces and pieces illustrative of the life of the Arabs of Algiers. Among the latter are the "Lion Hunt," "Council of Arabs," and "Arab Mother rescuing her Child from a Lion;" among the battle pieces, Jena, Friedland, Wagram, and Fontenoy, and a whole series representing the exploits of the French in Algiers, the "Capture of the Smala," "Battle of Isly," and many others, some of them of immense size. He also made hundreds of designs for illustrated works. At the universal exposition of 1855 he received the grand medal of honor. In 1862 he had begun a religious painting in his villa at Hyères. A severe fall led to his return to Paris, where he expired after several months of great suffering. His only child, Louise, married the painter Paul Delaroche, and left two sons, Horace and Philippe, who by a legal authorization assumed the name Delaroche-Vernet.—See *Joseph, Carle et Horace Vernet, correspondance et biographies*, by Durande (Paris, 1865).

VERNIER, an instrument attached to a scale for the purpose of measuring spaces smaller than those into which the scale is actually divided. The principle of the vernier will be best understood from the figure. The lower scale, marked 8-9, is part of a scale of inches divided into tenths. The upper scale, marked 0 . . . . 10, is the vernier, and is movable upon the scale of inches. The ten divisions of the vernier are exactly equal to nine subdivisions of the scale of inches, consequently each division of the vernier equals $\frac{9}{10}$ of $\frac{1}{10}$ of an inch, or 0·09 inch. When the 0 of the vernier coincides with one of the marks of the principal scale, the 1 of the vernier will fall 0·01 inch short of the next division of the principal scale, the 2 of the vernier will fall 0·02 inch short of the next division of the principal scale, and so on. If we shove the vernier forward 0·01 inch, its 1 will exactly coincide with one of the



Vernier.

subdivisions of the principal scale; if we shove it forward 0·02 inch, its 2 will exactly coincide, and so on. In the figure the vernier has been pushed forward until its 0 falls between 8·6 and 8·7 inch, and is supposed to be at the point to which we wished to measure. Looking along the vernier, we see that its division marked 7 exactly coincides with one of the divisions of the principal scale. The correct reading of the whole apparatus then is 8 inches, 6 tenths, and 7 hundredths, or 8·67. In what are sometimes called "retrograde verniers" 10 divisions of the vernier correspond to 11 of the principal scale, and are numbered and read in the opposite direction to the principal scale, but the principle involved is the same. Other ratios besides 9 : 10 or 10 : 11 between the vernier and the principal scale are employed in different instruments, according to the purposes for which they are intended. When great delicacy is required, the measuring instrument is furnished with a microscope, in order to perceive more accurately what lines exactly coincide, and also with two or three verniers, and all are read and the mean is taken. The vernier derives its name from Peter Vernier of Burgundy, an engineer, who invented the instrument in 1631.

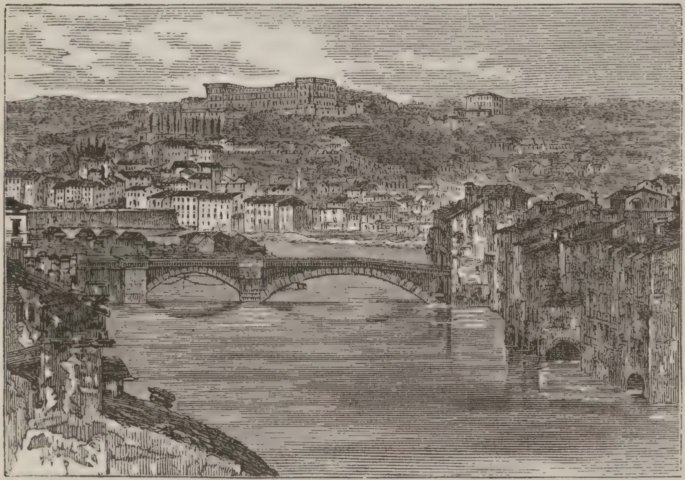
VERNON. I. A S. W. parish of Louisiana, separated from Texas on the west by Sabine river, and drained by Bayou Lanacoco and affluents of the Calcasieu river; area, about 1,450 sq. m.; pop. in 1875, 4,259, of whom 412 were colored. The surface is generally level, and much of the soil is fertile. There are extensive prairies that pasture large herds of cattle. The chief productions are Indian corn, sweet potatoes, and cotton. Capital, Leesville. **II.** A S. W. county of Wisconsin, separated from Iowa and Minnesota on the west by the Mississippi river, and drained by Raccoon and Kickapoo rivers and other streams; area, about 800 sq. m.; pop. in 1870, 18,645. The surface is undulating and consists largely of prairies; the soil is fertile. The chief productions in 1870 were 552,594 bushels of wheat, 290,846 of Indian corn, 445,526 of oats, 30,709 of barley, 82,349 of potatoes, 61,633 lbs. of wool, 484,741 of butter, 92,068 of hops, 37,647 of maple sugar, and 20,237 tons of hay. There were 4,676 horses, 5,560 milch cows, 10,924 other cattle, 21,456 sheep, and 15,612 swine; 8 manufactories of carriages and wagons, 5 flour mills, 11 saw mills, and 2 wool-carding and cloth-dressing establishments. Capital, Viroqua. **III.** A W. county of Missouri, bordering on Kansas, and drained by the Osage river and its affluents; area, about 700 sq. m.; pop. in 1870, 11,247, of whom 82 were colored. The surface is undulating and the soil fertile. It is intersected by the Missouri, Kansas, and Texas railroad. The chief productions in 1870 were 56,934 bushels of wheat, 476,230 of Indian corn, 98,793 of oats, 32,153 of potatoes, 145,775 lbs. of butter, 15,450 of wool, and 3,925 of tobacco. There were 4,168 horses, 4,202 milch cows, 11,361 other cattle, 6,822 sheep, and 15,099 swine. Capital, Nevada.

VERNON, Edward, an English admiral, born in Westminster, Nov. 12, 1684, died at his seat of Nacton in Suffolk, Oct. 29, 1757. He served in the expedition of Admiral Hopson, which on Oct. 12, 1702, destroyed the French and Spanish fleets off Vigo; and he was present at the sea fight off Malaga between the French and English in 1704. He attained the rank of rear admiral in 1708, and remained in active service till 1727, when he was elected to parliament for Penryn, and in the succeeding parliament, which lasted from 1734 to 1741, he sat for Portsmouth. In the house he loudly condemned all the measures of the ministry, without respect of persons, and in a debate declared that Porto Bello could be taken with six ships. For this remark he was extolled all over the kingdom, and to silence the general clamor the ministry sent him to the West Indies with the rank of vice admiral of the blue. In November, 1739, he appeared off Porto Bello with six men-of-war, and the city was taken the day after the attack began, the English losing only seven men. In January, 1741, he sailed from Jamaica with 29 ships of the line and 80 smaller vessels, having on board 15,000 sailors and 12,000 land troops, and on March 4 appeared before Cartagena, but was repulsed with loss, and sickness destroyed those who escaped. But Vernon did not lose his popularity in England, and in 1742 planned an expedition against Panama. He had been elected to the parliament of 1741 from Penryn, from Rochester, and from Ipswich. He accepted the representation of Ipswich, and was returned to the parliaments of 1747 and 1754. During the invasion of the pretender in 1745, he was employed to guard the coast of Kent and Sussex; in this he gave satisfaction, but on account of a quarrel with the admiralty his name was struck from the list of admirals.

VERNON, Robert, an English collector of paintings, born in 1774, died in London, May 22, 1849. He amassed a fortune in commercial pursuits, a great portion of which was devoted to the purchase of pictures, principally by British artists. As his collection grew beyond the capacity of his house, he presented the most valuable portion to the government in December, 1847. The British national gallery, founded in 1824, contained at the time of Mr. Vernon's donation but 41 pictures by native artists, and the Vernon collection, as it is still called, may be considered the nucleus of a national gallery of British art on a considerable scale. It was for some time exhibited at Marlborough house, but has now been removed to the South Kensington museum. It comprises 162 pictures, a marble group by Gibson of Hylas and the nymphs, and a number of busts.

VÉRON, Louis Désiré, a French journalist, born in Paris, April 5, 1798, died there, Sept. 27, 1867. He practised medicine in the foundling hospital and other institutions from about 1821 till 1828, and made a fortune by the lozenges of his deceased friend Regnauld. In 1829 he founded the *Revue de Paris.* In 1831 he became director of the opera, put on the stage works by Meyerbeer, Auber, and Halévy, and retired with large means at the end of 1835. In 1838 he was an unsuccessful candidate for the chamber of deputies. He purchased an interest in the *Constitutionnel* at the suggestion of Thiers, whose organ it was, and in 1844 became sole proprietor. In 1849 he deserted Thiers for Louis Napoleon, whose *coup d'état* of Dec. 2, 1851, he applauded; and he was elected as an official candidate to the legislative body, and reëlected in 1857. In January, 1862, he finally left the *Constitutionnel.* His works include *Mémoires d'un bourgeois de Paris* (7 vols., 1854–'6); *Cinq cent mille francs de rente,* a romance (2 vols., 1855); *Quatre ans de règne: Où allons-nous?* (1857); and *Les théâtres de Paris depuis* 1806 *jusqu'en* 1860.

VÉRON, Pierre, a French writer, born in Paris in 1833. He was the editor of the *Revue de Paris* from 1854 till its suppression in 1858, and subsequently was one of the editors of the *Charivari.* He is a voluminous writer on metropolitan life, one of his most recent works being *Le sac à la malice* (1875).



Verona.

VERONA. **I.** A N. E. province of Italy, in the W. part of Venetia, bordering on Tyrol and the provinces of Vicenza, Padua, Rovigo, Mantua, and Brescia, from which it is separated by the Mincio and the lake of Garda; area, 1,061 sq. m.; pop. in 1872, 367,437. The Adige flows through the centre of the province, and there are altogether 9 navigable rivers and 13 canals, and many streams and torrents. The N. part is mountainous; the other parts are level or undulating. There are marshes in the south, but the soil is generally fertile, and the pastures rich. The productions include grain, rice, fruit, flax, silk, oil, and wine, and several minerals. Lake Garda and the rivers are well stocked with fish, and game is plentiful. The principal mineral springs are at Caldiero. The chief towns, besides the capital, are Legnago, Villafranca, and Caprino. **II.** A city, capital of the province, at the foot of the last spurs of the Tyrolese Alps, on both sides of the Adige, surrounded by groves and villas, in one of the finest regions of N. Italy, 62 m. W. of Venice; pop. in 1872, 67,080. The Adige is crossed by many bridges, the finest and most recent connecting with the railway station, and floating mills are moored in the river. The fortifications were begun by the emperor Gallienus and continued by Theodoric and Charlemagne. The Scala dynasty erected forked battlements and towers, and the Venetians originated the outworks. Sammicheli introduced in the 16th century the triangular and pentangular bastions, and his plans made the whole system of fortification a marvel of modern engineering. His ramparts and bastions were almost entirely destroyed under the treaty of Lunéville (1801), but the Austrians subsequently made it a formidable stronghold. Sammicheli's celebrated gates, the Porta Nuova and Porta del Palio or Stuppa, still remain, as well as vestiges of the Roman and subsequent walls. The principal square is the piazza dei Signori, with the palazzo del Consiglio, the colossal statue of Dante erected May 14, 1865, the Scala palaces occupied by the local authorities, and a campanile consisting of one magnificent piece of brickwork, 300 ft. high. The piazza delle Erbe, or vegetable market, was the forum of the republican era of the city. Besides the Corso, there are several fine avenues, but most of the streets are unsightly. Conspicuous among 48 churches is the cathedral of Sta. Maria Matricolare, mostly rebuilt in the 12th century, with exceedingly rich chapels and monuments, and with Titian's "Assumption." Attached to the cloister is the Capitolare library, with important collections of historical, theological, and legal works and manuscripts. Sant' Anastasia is one of the finest Gothic churches in the whole country, though the front is not finished. San Zenone is the most characteristic specimen of mediæval ecclesiastical architecture; it has a rich interior of singular grandeur, and the belfry of brick and marble, with arches and turrets, is one of the most remarkable of its kind. San Fermo, called *maggiore* from its size, dates from the 8th century, and has remarkable monuments. The interior of San Giorgio Maggiore was embellished by Sammicheli, and contains paintings by Paul Veronese and other masters. Close to Sta. Maria Antica are the tombs of the Scala family. Verona is emphatically a city of palaces; several, such as the Canossa, Pompei, and Maffei (now Tresa) palaces, are among Sammicheli's masterpieces. The palace of the resident bishop (*vescovado*) was principally restored in the 14th century. Castel Vecchio and the adjoining bridge were built by Cangrande II. The picture gallery has been removed from the Consiglio to the Pompei alla Victoria palace in the via di Porto at the Campo Marzio, facing the Adige; it contains large collections, chiefly paintings by Veronese masters. The most imposing Roman antiquity in Verona is the ruined amphitheatre, contemporary with the Colosseum of Rome, built of marble, originally 513 ft. long, 410 ft. broad, with a length of arena of 248½ ft., and 100 ft. high, and accommodating 22,000 spectators. Part of it is intact; the interior is used as a circus, and the arcades for shops. Among numerous other Roman relics are fragments of a theatre and the Porta de' Borsari and Arco de' Leoni. Verona has associations with Dante, Petrarch, and Shakespeare's "Romeo and Juliet." The tomb of Juliet has long been destroyed, though one is still shown for the gratification of tourists. The city has a lyceum, a gymnasium, a theological seminary, a technical institute, an academy of painting and sculpture, a city library, an agricultural academy, a society for bee culture, and a private institution for indigent girls, who excel in silk and gold embroideries and artificial flowers. Among the many art collections, the Maffei is rich in inscriptions, statues, and vases. Silk, woollen, linen, and other goods are made. There is an active trade in these, and in grain, oil, and sumach, which has much increased since the opening in 1867 of the Brenner railway, which makes Verona the centre of mercantile communication with Germany, as it formerly was of military movements in N. E. Italy.—Verona was originally an important town in Gallia Transpadana, and it became a flourishing Roman colony with the surname of Augusta. In A. D. 312 it was conquered by Constantine the Great in his march from Gaul, and in 489, on the defeat of Odoacer, it was taken by Theodoric the Great, who often held his court at Verona. Charlemagne captured it in 774, and it afterward became a free city. The Scala family obtained supreme power in 1260, and were overthrown in 1387 by Giovanni Galeazzo Visconti of Milan. Cangrande, Dante's friend, was the most celebrated ruler of the former house. (See SCALA, and CANE I. DELLA SCALA.) In the beginning of the 15th century it was annexed to Venice. The French took Verona in 1796, and ceded it in 1797 to Austria, but again held it from 1805 to 1814, when it was recovered by Austria. The congress of Verona (October to December, 1822), over which Metternich presided with Gentz for his secretary, aimed at the termination of the disturbed condition of Spain and Turkey and of revolutionary agitation in Europe, and its principal result was the French intervention in Spain in the following year. In 1866 Verona was incorporated with the kingdom of Italy.—See Maffei's *Verona illustrata* (Verona, 1731–'2; new ed., 8 vols., 1792–3); Ronzani's *Le antichità de Verona* (1833); and G. da Persico's *Descrizione di Verona e della sua provincia* (1838).

VERONESE, Paul. See CAGLIARI.

VERPLANCK, Gulian Crommelin, an American author, born in New York, Aug. 6, 1786, died there, March 18, 1870. He graduated at Columbia college in 1801, studied law, and passed several years in European travel. In 1820 he became a member of the New York legislature, and not long afterward professor of the evidences of Christianity in the general Protestant Episcopal seminary in New York. From 1825 to 1833 he was a member of congress, and afterward several times of the state senate. He published "The State Triumvirate, a Political Tale," "Bucktail Bards," and "The Epistles of Brevet Major Pindar Puff" (1819), political pamphlets chiefly aimed at De Witt Clinton; "Essays on the Nature and Uses of the Various Evidences of Revealed Religion" (1824); nearly half of the annual in prose and verse called "The Talisman" (3 vols., 1827–'30); "Discourses and Addresses on Subjects of American History, Arts, and Literature" (1833); an edition of Shakespeare (3 vols., 1844–'7); and several college orations, the best known of which is "The American Scholar," delivered at Union college in 1836. He prepared also for 15 years nearly all the annual reports of the commissioners of emigration, of which board he was president.

VERRAZZANO, Giovanni da (called also VERRAZANI), a Florentine navigator, born about 1485, executed at Puerto del Pico, Spain, in November, 1527. He was of a good family of the Val di Greve near Florence, and went to France, where he found employment as a navigator. References in French annals make it possible that he visited the northern coast of America as early as 1508. He soon became famous as a corsair against the Spaniards and Portuguese, made valuable captures in 1521, and in 1522 captured the treasure ship in which Cortes was sending to Charles V. the rich spoils of Mexico, valued at more than $1,500,000. His next depredation on the Portuguese roused Spain and Portugal against him, and he was finally captured in September or October, 1527, taken to Spain, and executed by the emperor's orders. In 1556 Ramusio published in his collection of voyages a letter which he ascribed to Verrazzano, purporting to have been written at Dieppe, July 8, 1524, and giving to Francis I. an account of a voyage to the coast of North America and its exploration from lat.

34° to 50°. This letter was gradually received as authentic, and Verrazzano mentioned in American history as the earliest French explorer of the coast, and possibly the first to enter New York bay. Its authenticity was first attacked in 1864 by T. Buckingham Smith, who identified Verrazzano with the corsair Juan Florin of Spanish accounts, but was maintained by J. Carson Brevoort in "Verrazzano, the Navigator" (8vo, New York, 1874). Henry C. Murphy, after careful researches, rejects the letter as spurious in his "Voyage of Verrazzano, a Chapter on the Early History of Maritime Discovery in America" (8vo, New York, 1875). The attempted fraud is not attributed to Verrazzano, but to some one of his countrymen, anxious to secure for Italy the glory more credibly belonging to Estevan Gomez, a Portuguese, who went as chief pilot with Magellan, and has the credit of visiting the coast of Carolina and entering several rivers in 1525.

VERRES, a Roman governor of Sicily, put to death in 43 B. C. He was the son of a Roman senator, and in 82 became quæstor to Cn. Papirius Carbo, but subsequently deserted the Marian faction to which Carbo belonged, and joined that of Sulla, who gave him a share of the confiscated estates and sent him to Beneventum. He was pro-quæstor to Dolabella, prætor of Cilicia, 80–79, and participated in the iniquitous acts of that rapacious governor, but afterward turned against him, and contributed by his evidence to his conviction. With the money obtained by plundering the provinces, he was elected prætor in 74, and became by lot *prætor urbanus.* After managing the affairs of the city in defiance of all justice and law, he obtained at the expiration of his term of office the administration of Sicily, then the wealthiest province of the republic. In this island he remained three years, during which time he amassed enormous wealth, and fairly desolated Sicily by his rapacity. The Sicilians intrusted to Cicero the prosecution of Verres, the importance of which was more due to political reasons than to the character of the criminal. Verres was defended by Hortensius, and supported by the Scipios and the Metelli. The decision was to be made by the senate, on whom the judicial power taken from the equites had been conferred by Sulla; and on the result of this trial depended in great measure the continuance of this power, inasmuch as there was a strong feeling among the people in favor of a reform of the court. The adherents of Verres spared nothing in the shape of promises, threats, and bribes, in order to secure his acquittal; but their efforts were useless, and before the nine days which were given to the hearing of evidence were over, he fled to Massilia, where he remained in exile 27 years. He was put to death by the proscription of Antony.

VERROCCHIO, Andrea, an Italian artist, born in Florence in 1432, died there in 1488. He was at once a sculptor, a goldsmith, and a painter, but most distinguished as a sculptor. Perugino and Leonardo da Vinci were his pupils. He was the first to take moulds of the human form to aid in designing. The pictures attributed to him are generally spurious.

VERSAILLES, a city of France, capital of the department of Seine-et-Oise, and legally of the republic, 10 m. S. W. of the centre of Paris; pop. in 1872, 61,686. It is built with great regularity, the streets crossing each other at right angles, and has a monotonous appearance. The main thoroughfares are the avenues de Paris, St. Cloud, and Sceaux, the place d'Armes, and the boulevard de la Reine. The principal churches are those of Notre Dame and St. Louis, and there is an English chapel. Among the public buildings are the tennis court, famous for the short part which it played in the beginning of the revolution of 1789, a lyceum, and other schools and hospitals. Versailles derives its celebrity from the royal palace built by Louis XIV. on the site of Louis XIII.'s hunting lodge, where that monarch and his successors resided till the revolution. The marble court and the interior, which is 105 ft. long and 79 ft. high, are remarkable for extraordinary magnificence and grandeur, especially the vast museums or galleries, with statues and pictures of the great historical personages and events of the country, described in Gavard's *Galeries historiques de Versailles* (13 vols., Paris, 1835–'48). Connected with the palace are chapels, an extensive library, and magnificent gardens, where fountains playing on Sundays attract multitudes of visitors from Paris. Louis XV. added the theatre and other buildings. The park connects with the Grand Trianon and the Petit Trianon palaces; the latter was the favorite residence of Marie Antoinette. Adjoining the palace are the military hospital and the artillery and cavalry barracks. The most brilliant periods of the reigns of Louis XIV. and Louis XV., as well as the beginning of the catastrophe under Louis XVI., are associated with the residence of those monarchs at Versailles. The definitive treaty which terminated the American struggle for independence was concluded here, Sept. 3, 1783, and the states general were opened here May 5, 1789. Napoleon I., Louis XVIII., and Charles X. attempted to repair the damage inflicted upon the palace during the revolution, and under Louis Philippe it was fully restored. During the Franco-German war of 1870 Versailles became the headquarters of the Germans; the king of Prussia was proclaimed here (in the palace) emperor of Germany, Jan. 18, 1871; the capitulation of Paris was concluded here ten days later, and the preliminary treaty of peace on Feb. 26, and the national assembly and seat of government were removed hither from Bordeaux. Many prisoners were transferred to Versailles during the war with the commune, and shot in the neighboring plain of Satory. The constitutional provisions of February, 1875, made Versailles the legal capital, though it is practically only the seat of the senate and assembly, which occupy chambers in the palace.

VERTEBRA. See Skeleton.

VERTEBRATA, a name applied by Lamarck to the highest branch of the animal kingdom, from its being characterized by a bony or cartilaginous internal skeleton, of which the most essential and persistent portion is the vertebral column or spine. (See Comparative Anatomy, Philosophical Anatomy, and Skeleton.) Aristotle had made the distinction of ἔναιμα (blood animals) and ἄναιμα (bloodless animals), corresponding respectively to the vertebrata and invertebrata of Lamarck. Oken called the vertebrates *sarcozoa* or flesh animals; Ehrenberg, *myeloneura;* De Blainville, *osteozoaria;* and Owen, *myelencephala.* These various terms describe very accurately the relations of the skeleton, red blood, muscles, and cerebro-spinal nervous centres, characteristic of fishes, batrachians, reptiles, birds, and mammals. The essential character of the spinal column is to have a distinct cavity above the axis for the nervous centres, and another below for the organs of vegetative life, both circumscribed by complicated bony arches. Vertebrates are the doubly symmetrical type of Von Baer, their embryological development producing identical parts arising on both sides of an axis, growing upward and downward and shutting up along two lines, the inner layer of the germ being enclosed below and the upper above; Van Beneden calls them *hypocotyledones* or hypovitellians, from the vitellus or yolk entering the body from the under or ventral side. Lamarck also styles them intelligent animals, but comparative psychology is not sufficiently advanced to enable us to distinguish in this way between the sensations of a fish and a cephalopod or an insect. In vertebrates reproduction is sexual, without normal hermaphroditism, and the jaws move vertically and not laterally. Ehrenberg divides vertebrates into *nutrientia*, or warm-blooded, and taking care of their young, like mammals and birds; and *orphanozoa*, cold-blooded, taking no care of their young, like reptiles and fishes; but some of the latter do take care of their young, in a different or in the same way as the former division. The classes of vertebrates, according to Agassiz, are: 1, myzonts (myxinoids and cyclostomes); 2, fishes proper; 3, ganoids (sturgeons, &c.); 4, selachians (sharks and rays); 5, amphibians (frogs, salamanders, &c.); 6, reptiles; 7, birds; and 8, mammals. In this type, to use his words ("Atlantic Monthly," January, 1862, p. 12), "the head is the prominent feature; it is, as it were, the loaded end of the longitudinal axis, so charged with vitality as to form an intelligent brain, and rising in man to such predominance as to command and control the whole organism." The classification adopted by Prof. Owen is as follows: I., *pisces*, with the subclasses *dermopteri* (*cirrostomi*, *cyclostomi*), *teleostomi* (*malacopteri*, *anacanthini*, *acanthopteri*, *plectognathi*, *lophobranchii*, *ganoidei*), *plagiostomi* (*holocephali*, *plagiostomi*), and *protopteri* (*lepidosiren*); II., *amphibia*, with the orders *ophiomorpha*, *ichthyomorpha*, *theriomorpha*, and *labyrinthodontia ;* III., *reptilia*, with the orders *chelonia*, *lacertilia*, *ophidia*, *crocodilia*, and the extinct *ichthyopterygia*, *sauropterygia*, *anomodontia*, *dinosauria*, and *pterosauria ;* IV., *aves*, divided into the three sections of *altrices* (embracing the *raptores*, *scansores*, *volitores*, and *cantores*), *præcoces* (*rasores*, *cursores*, *grallatores*, *natatores*), and *uroioni* (archæopteryx); V., *mammalia*, with the four subclasses of *archencephala* (*bimana*), *gyrencephala* (*quadrumana*, *carnivora*, *artiodactyla*, *perissodactyla*, *proboscidia*, *toxodontia*, *sirenia*, *cetacea*), *lissencephala* (*bruta*, *cheiroptera*, *insectivora*, *rodentia*), and *lyencephala* (*marsupialia*, *monotremata*). Huxley makes the vertebrata his sixth subkingdom, characterized by the body composed of definite segments arranged longitudinally or one behind the other. The main masses of the nervous system are on the dorsal aspect, and are completely shut off from the general body cavity. The limbs, when present, are turned away from that side of the body on which the main nervous masses are situated, and are never more than four. He divides the vertebrata into three primary provinces, viz.: *ichthyopsida* (fishes and amphibians), *sauropsida* (reptiles and birds), and *mammalia.* His classes are the following: I., *pisces*, with the orders *pharyngobranchii*, *marsipobranchii*, *teleostei*, *ganoidei*, *elasmobranchii*, and *dipnoi ;* II., *amphibia*, with the orders *urodela*, *labyrinthodontia*, *gymnophiona*, and *anoura ;* III., *reptilia*, with the orders *chelonia*, *lacertilia*, *ophidia*, *crocodilia*, *plesiosauria*, *ichthyosauria*, *dicynodontia*, *ornithoscelida*, and *pterosauria ;* IV., *aves*, with the groups *ratitæ* (with the sternum devoid of a keel), *carinatæ* (sternum provided with a keel), and *saururæ ;* V., *mammalia*, with the groups *ornithodelphia* (*monotremata*), *didelphia* (*marsupialia*), and *monodelphia* (*edentata*, *ungulata*, *toxodontia*, *sirenia*, *cetacea*, *hyracoidea*, *proboscidea*, *carnivora*, *rodentia*, *insectivora*, *cheiroptera*, and *primates*). For further details of his classification of birds, see Ornithology. Modifications of these classes and orders are almost as numerous as the specialists who have investigated them, and chiefly of interest to students of the history of zoölogy.

VERTIGO (Lat., from *vertere*, to turn), a common symptom of cerebral disturbance, with or without obscurity of vision, in which objects appear to turn round; besides the abnormal subjective sensations, there may be disordered movements prompted thereby. It may arise from too much or too little blood sent to the brain; from poisons in the circulation, as in alcoholic and other intoxication; and from lesions of the sensorial centres or the nerves therewith connected. The effect is that the intelligence is not able to correct the erroneous suggestions of the senses. It is most commonly a symptom of congestion of the brain, and often indicates an approaching attack of apoplexy, epilepsy, or paralysis.

VERTNER, Rosa (JEFFREY), an American authoress, born near Natchez, Miss. She is the daughter of John Griffith, but was adopted by an aunt, whose name Vertner she took. She was educated in the seminary under the charge of Bishop Smith, in Lexington, Ky. She married Claude M. Johnson, and after his death Alexander Jeffrey of Lexington, where she now resides (1876). In 1850 she became a contributor to the Louisville "Journal," and afterward to numerous periodicals, and in 1857 a volume of her poems was published in Boston. She has also published "Woodburn," a novel (New York, 1864), and several tales and poems under the signature of Rosa, which have not been collected.

VERTOT, René Aubert de, a French historian, born at the château of Benetot, Normandy, Nov. 25, 1655, died in Paris, June 15, 1735. He was successively a Capuchin and Premonstratensian monk and a secular priest, in 1701 became a member of the academy of inscriptions, and was afterward historiographer of the knights of Malta and secretary to the duke and duchess of Orleans. His works, valued more for their style than for their accuracy, are: *Histoire des révolutions de Portugal* (Paris, 1689); *Histoire des révolutions de Suède* (2 vols. 12mo, 1696); *Histoire complète de l'établissement des Bretons dans les Gaules* (1710); *Histoire des révolutions arrivées dans le gouvernement de la république romaine* (3 vols. 12mo, 1719); and *Histoire des chevaliers hospitaliers de St. Jean de Jérusalem* (4 vols. 4to, 1726).

VERTUMNUS, or **Vortumnus,** an Etruscan or Sabine divinity, worshipped by the ancient Romans as the god who presided over the seasons, and the blossoming and bearing of trees and plants. He had the power of assuming any shape he pleased. Falling in love with Pomona, the goddess of garden fruits, he appeared to her in a variety of forms, and at last won her under the guise of a blooming youth. A *flamen* was appointed at Rome especially to superintend his worship; a festival called the Vortumnalia was celebrated in his honor on Aug. 23; and offerings were brought him of first fruits from the garden and wreaths of flowers. In works of art he was represented, like Saturn, with a pruning knife in his hand and a wreath of ears of corn on his head.

VERUS, Lucius. See ANTONINUS, MARCUS AURELIUS.

VERVAIN. See VERBENA.

VERVIERS, a town of Belgium, in the province and 14 m. E. S. E. of the city of Liége, on the Vesdre, near the Prussian frontier; pop. in 1873, 38,875. It contains fine churches and other public buildings, including a chamber of commerce, and has celebrated cloth manufactories, the annual products of which are valued at 100,000,000 francs, including those of the adjacent villages. One third is exported. There are more than 60 mills in the town and its vicinity, employing about 40,000 persons and 150 steam engines. The fortifications were destroyed by Louis XIV.

VESALIUS, Andreas, a Flemish physician, born in Brussels, Dec. 31, 1514, died in the island of Zante, Oct. 15, 1564. He was educated at Louvain, Montpellier, and Paris, and was early distinguished by his devotion to anatomical studies. In the last named city he became chief assistant of Gunther, and in 1536 discovered the origin of the spermatic blood vessels. The pursuit of practical anatomy was attended with so much difficulty and danger in France, that after returning to Louvain he joined the army of Charles V. of Germany, and went to Italy, where in 1540 he was made professor of anatomy in the university of Pavia, in 1543 in that of Bologna, and not long afterward in that of Pisa. In 1543 he published his great work on anatomy, *De Corporis Humani Fabrica* (fol., Basel; enlarged ed., 1555). In this Vesalius exposed the errors of the Galenian school, who relied for their knowledge of the anatomy of the human body upon the observations made in the dissection of the bodies of the lower animals. The work met with the fiercest opposition; nevertheless the author's reputation increased. About 1544 he was made chief physician to Charles V., and afterward to his son Philip II.; and the duties which devolved upon him gradually deprived him of all opportunity of increasing his knowledge of anatomy. In 1563 or 1564 he suddenly left Madrid to make a pilgrimage to Jerusalem, for reasons not known. On his arrival there he received an offer from the Venetian senate of the professorship of anatomy at Padua. On the voyage back he was wrecked on the island of Zante, where he died probably from fatigue and exposure. Besides his great work, he wrote *De Radicis Chinæ Usu Epistola* (Venice, 1546); *Anatomicarum Gabrielis Fallopii Observationum Examen* (1564); *Examen Apologiæ Fr. Putæi pro Galeno* (1564); and a paraphrase and translation of some of the works of the Arabic physician Rhazes. His complete works, together with a life, were published at Leyden in 1725 (2 vols. fol.), edited by Boerhaave and Albinus.

VESOUL, a town of France, capital of the department of Haute-Saône, at the junction of the Durgeon with the Colombine, about 190 m. S. E. of Paris; pop. in 1872, 7,597. The fortifications have been converted into promenades, and it has a church of the 18th century with a fine altar, a museum rich in Gothic and Roman antiquities, cavalry barracks, a lyceum, a normal seminary, a public library, a theatre, manufactories of turned ware and of cotton and silk goods, and trade in grain, cattle, leather, and iron ware. In the vicinity are many vineyards, iron works, and a mineral spring. On the adjoining Mt. La Motte (1,400 ft. high) is a statue of the Virgin, erected in 1854 as a memorial of the town's exemption from cholera. The Germans took Vesoul Oct. 18, 1870.

VESPASIAN (Titus Flavius Sabinus Vespasianus), a Roman emperor, born near Reate in the Sabine country, Nov. 17, A. D. 9, died there, June 24, 79. His father was a petty officer of the revenue, who died while the son was still young. Vespasian served in Thrace as military tribune, became quæstor in Crete and Cyrene, and subsequently ædile and prætor. In the reign of Claudius he went to Germany as *legatus legionis*, and in 43 held the same command in Britain, where he served under Aulus Plautius and under the emperor himself, and reduced the isle of Wight. Triumphal honors were granted him, and during the last two months of 51 he was made *consul suffectus*. Subsequently he governed Africa as proconsul. At the end of 66 he was sent by Nero to the East to take command of the army in the Jewish war. In two years he reduced all Judea except Jerusalem and some minor strongholds. His reputation now rose so high, that on the breaking out of the civil war between Otho and Vitellius after the death of Galba, the prefect of Egypt proclaimed Vespasian emperor at Alexandria, July 1, 69. The choice was immediately ratified by the legions of Judea, and not long afterward by the entire army of the East. His son Titus was left to put an end to the Jewish war, while one of his generals, Antonius Primus, marched at once into Italy, defeated the troops of Vitellius, and put Vitellius himself to death. In the mean time Vespasian had gone to Alexandria to cut off the supply of grain from Rome, but his recognition by the senate made the step unnecessary. In the summer of 70 he arrived in Italy, where his coming was hailed with great joy. His accession worked a great change in the condition of the empire. He maintained firm discipline among the soldiers, removed many unworthy senators and knights, restored order to the finances, and repaired the devastations of the recent civil commotions. He rebuilt the capitol, erected a temple to Peace, and began the Flavian amphitheatre, which was afterward called the Colosseum. The foreign wars of his reign were successful. The rebellion of the Batavi under Claudius Civilis was put down; Titus completed the conquest of Judea; the governor of Syria took possession of Commagene; and a war was carried on in Britain with great success. In 71 the temple of Janus was closed, and in 74 the last census of Roman citizens ever made was taken. In 79 a conspiracy formed by Alienus Cæcina and Marcellus was discovered, and the former was summarily put to death, while Marcellus committed suicide. In the summer of the same year Vespasian on account of failing health retired to his early home in the Sabine country. He was one of the best and wisest of the Roman emperors, although his personal character was disfigured by certain mean traits, the most conspicuous of which was avarice. His simple style of living furnished a strong contrast to the luxury and debauchery of his immediate predecessors. The two succeeding emperors were his sons Titus and Domitian.

VESPERS (Lat. *vesper*, evening), in the Roman Catholic church, a portion of the divine office recited daily by priests, and generally sung publicly, as the afternoon service, on Sundays and other high festivals. It consists of five of the psalms of David, a hymn, the *Magnificat*, or canticle of the Virgin Mary, from the 1st chapter of St. Luke, and several prayers, anthems, &c.

VESPUCCI, Amerigo, an Italian navigator from whom the name of America is derived, born in Florence, March 9, 1451, died in Seville, Feb. 22, 1512. He was in business in Seville as an agent of the Medici family when Columbus returned from his first voyage; and in 1496, while fitting out four caravels for the Spanish service in the countries lately discovered, he occasionally met with Columbus, and was induced to prepare for a career of nautical adventure. In 1499 he sailed from Spain in an expedition under Ojeda which visited the neighborhood of Cape Paria and several hundred miles of coast, and returned in June, 1500. In July Vespucci wrote to one of the Medici of Florence an account of the voyage, which lay hid in manuscript till 1745, when it was published by Bandini. In May, 1501, he entered the service of Emanuel, king of Portugal, and participated in an expedition which visited the coast of Brazil. Of this voyage he also wrote an account to the same member of the Medici family, which was first brought to light by Bartolozzi in 1789. In 1504 he sent to the same person a fuller narrative of this expedition, which was published at Strasburg in 1505, under the title, *Americus Vesputius de Ora Antarctica per Regem Portugallie pridem inventa*. From this voyage he acquired the reputation of being the discoverer of the mainland. In May, 1503, he commanded a caraval in a squadron that sailed for the discovery of Malacca, but parted company from the rest, and finally made his way to the coast of Brazil, where he discovered the bay of All Saints, remained there two months, then ran 260 leagues further S., where he built a fort, took in a cargo of Brazil wood, and after a stay of five months stood for Lisbon, which he reached in June, 1504. Early in 1505 he sought employment from the Spanish court, and received from King Ferdinand letters of naturalization. Before March 22, 1508, he became pilot major with a salary of 70,000 maravedis. He was placed over a *depósito hydrográfico*, and was charged with the preparation for the *casa de contratacion* of a general description of coasts and accounts of expeditions, in which every year new discoveries were to be entered, besides the construction of charts, the examination of pilots, and other duties. After his return from his

Brazil expedition in 1504, he wrote from Lisbon a letter to René, duke of Lorraine, containing an account of four voyages to the new world, wherein he says that the first expedition in which he was concerned sailed from Cadiz May 20, 1497, and returned in October, 1498. This remark has been the source of a fierce controversy as to the first discovery of the mainland of America, and as to the true character of Vespucci, against whom it has been charged that after the return from his first voyage to Brazil he made a maritime chart, in which he gave his name to that part of the mainland. The statement in the letter is unquestionably false. The name Americi Terra was applied to this continent as early as 1507, by Waldsee-Müller (Martinus Hylacomylus), a geographer of Freiburg in Breisgau, in a small work entitled *Cosmographiæ Introductio, . . . insuper quatuor Americi Vespucci Navigationes.* It does not appear that Vespucci himself had any intention of taking the honor of the discovery from Columbus, with whom he was on friendly terms; and it was not until the appearance of the *Opusculum Geographicum* of Schoner in 1533, and of the attack of Servetus in the Lyons edition of Ptolemy in 1535, that charges were brought against him. —See "Life and Voyages of Americus Vespucius," by C. E. Lester (New York, 1846), and "Vespucius and his Voyages," by Santarem, translated by E. V. Childe (Boston, 1850).

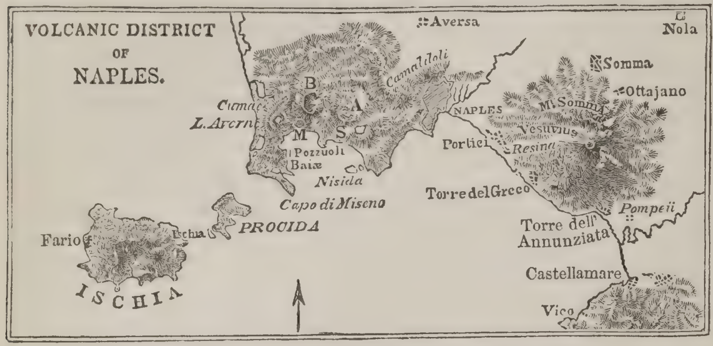
VESTA, the Roman name of the goddess of the home or hearth, identical with the Greek Hestia. According to the Hesiodic theogony, she was the daughter of Cronos (Saturn) and Rhea. Her brother Jupiter permitted her to assume a vow of perpetual celibacy, and granted her the first oblations in all sacrifices. She was not represented by any statue in the temple devoted to her honor, but by the symbolic fire which was kept perpetually burning on the hearth or altar by the vestals, her virgin priestesses. In art she was represented as a slender virgin of noble aspect, standing or sitting, clad or veiled, and holding a lamp or a sacrificial plate in one hand and a sceptre in the other. From her connection with the domestic hearth, every house was regarded in a certain sense as consecrated to her worship; and in the Roman religion she was connected with the Penates. In Greece her priestesses were widows; in Rome they were maidens, and were denominated vestal virgins. In Rome, on March 1 of every year, the sacred fire and the laurel tree shading her hearth were renewed; on June 9, the festival called *Vestalia* was celebrated; and on June 15 her temple was cleansed and purified.

VESTAL VIRGINS (Lat. *vestales*), the priestesses who served in the temple of Vesta, and guarded the sacred fire. The earliest traditions ascribe their origin to a period before the foundation of Rome, Rhea Sylvia, the mother of Romulus, belonging to their number; but their establishment as a part of the Roman religious worship is usually attributed to Numa Pompilius. He selected four for this office, which number was afterward increased to six. At first they were selected by the king, but during the republic and the empire by the *pontifex maximus.* Originally none but the daughters of freeborn parents could be chosen; but so great was the reluctance of fathers to part with the control of their children, that in the time of Augustus *libertinæ* were also taken. The persons selected were obliged to be from six to ten years of age, without physical blemish; their parents must be residents of Italy who had never pursued any dishonorable profession. Their chief duty was to watch by turns night and day the sacred fire on the altar of Vesta, the extinction of which, whether happening from carelessness or design, was regarded as an omen of terrible evil to the state. They also watched over the Palladium, a small wooden image of Minerva, which according to the myth fell from heaven upon the citadel of Troy, and was carried thence to Greece, and afterward to Rome; upon the preservation of this figure the people believed that the existence of the Roman power depended. The term of service lasted 30 years, the first 10 of which the priestess passed in learning her duties, the next 10 in performing them, and the remaining 10 in instructing others. After that time she might return to the world, and even marry; but the privilege was rarely taken advantage of. The greatest importance was attached to the chastity of a vestal; and when she violated her vow in this respect, she was, according to the law of Numa, stoned to death, but according to the practice from the time of Tarquinius Priscus, she was buried alive in a place called the Campus Sceleratus near the Colline gate. Her paramour was scourged to death in public in the forum. The vestals were supported at the public expense, completely released from the control of their parents, could bear testimony in a court of justice without taking an oath, and could make wills; whenever they went abroad, they were preceded by lictors, and consuls and prætors made way for them, and lowered their fasces; a criminal whom they accidentally met was spared from punishment if they demanded it; and their intercession in behalf of accused persons had great weight. Wills and solemn treaties were intrusted to their care, and conspicuous places were given them at the shows, and by Augustus at the theatres also. The oldest of the vestals was called *vestalis maxima* or *virgo maxima.*

VESTRIS (originally VESTRI), the name of a family of dancers of Italian extraction, who emigrated from Florence to Paris about 1740. **I. Angiolo Maria Gasparo,** born in Florence in November, 1730, died in Paris, June 10, 1809. He made his first appearance in Paris in 1769 at the Italian theatre, in which he performed with great success until his retirement on a pension in 1780. **II. Gaetano Apollino Baldassare,**

brother of the preceding, born in April, 1729, died in Paris, Sept. 27, 1808. His career at the theatre extended from 1749 to 1781, during most of which time he held the posts of ballet master and first dancer. He was popularly known as the "god of dancing," but his talent was executive rather than inventive; and he left little worthy of his reputation, his chief compositions being the ballets of *Endymion* and *Le nid d'oiseaux.* He was exceedingly ignorant and vain. "There are but three great men in Europe," he once observed, "the king of Prussia, M. Voltaire, and myself." His vanity was so original and amusing as to offend no one, and rather added to his reputation. In other respects he was a man of great honesty and amiability. **III. Marie Auguste,** called Vestris-Allard, or Vestris II., natural son of the preceding, born in Paris, March 27, 1760, died there, Dec. 6, 1842. He made his début in 1772, and from 1780 to 1816 was first dancer at the opera. He appeared for the last time at the age of 75, at a benefit given to Mme. Taglioni, and won great applause. Though inferior in dignity to his father, he surpassed him in strength and agility. He retired from the stage in 1819, and was professor in the conservatory till 1828. **IV. Auguste Armand,** son of the preceding, made his début in 1800 in a ballet in which his father and grandfather also took part. He had a great reputation throughout Europe. **V. Madame** (Bartolozzi), wife of the preceding, born in London in 1797, died Aug. 9, 1856. She was the granddaughter of Bartolozzi the engraver, was married in 1813, and in 1815 made her first appearance upon the Italian stage as Proserpina in the opera of that name. Subsequently she became one of the most popular English actresses of the day, particularly in male parts which admitted of a display of her figure. She excelled in ballad music, in which her voice, a sweet and powerful contralto, appeared to great advantage. Late in life she married Charles Mathews the younger, but retained her former name, and had the management successively of several London theatres.

VESUVIUS, a volcano of southern Italy, on the E. shore of the bay of Naples, 8 m. E. S. E. of the city. It is the eastern extremity and the principal vent of a chain of volcanoes extending from it through the Phlegræan fields to the islands of Procida and Ischia. Before the Christian era Ischia seems to have been the principal scene of volcanic disturbance in this district, and we have no record of any eruption of Vesuvius previous to that of A. D. 79, by which Pompeii and Herculaneum were destroyed. It is frequently mentioned by the older writers without reference to its volcanic character, but Strabo inferred from its structure that it had been a volcano, and Diodorus Siculus says it had "many signs of having been burning in ancient times." Viewed from Naples, Vesuvius appears to have two peaks, which are called respectively Somma and Vesuvius. But the ancient mountain, according to Strabo, had but one, a truncated cone with an even outline; and it is to be inferred from Plutarch that it had a crater with steep cliffs, the interior of which was overgrown with wild vines. The flanks of the mountain were covered with cultivated fields, and on the bay at its foot were Pompeii and Herculaneum. The site of the latter is now occupied by the village of Resina. It is supposed that the walls of this ancient cone were destroyed in the eruption of 79, when the present cone was formed. In this eruption only scoriæ and ashes were ejected, and there is no well authenticated record of a flow of lava from the mountain before 1036, when the lava is said to have reached the sea, although eruptions had taken place in 203, 472, 512, 685, and 993. In the eruption of 472 the ashes were carried as far as Constantinople, and in that of 512 to Tripoli. Other eruptions occurred in 1049, 1138 or 1139, and 1306, during the last of which terrible earthquakes shook the surrounding country, and destroyed Isernia and Brindisi and many thousand lives. In 1198 Solfatara was in eruption, and in 1302 Ischia, both discharging lava. With the exception of a slight eruption in 1500, Vesuvius was quiet till 1631; but during this period Etna was unusually active, and in 1538 (Sept. 29 and 30) a volcanic cone, now called Monte Nuovo, was raised in the bay of Baiæ 440 ft. high, covering an area 8,000 ft. in circumference. During the 131 years preceding the eruption of 1631 the sides of the crater became overgrown with trees and shrubs, below which was a plain where cattle were pastured. The eruption, which began in December, 1631, and lasted till February, 1632, was accompanied with many streams of lava and torrents of boiling water, which overflowed the towns at its base and destroyed many thousand lives. After this eruption the cone was 1,530 ft. lower than that of Somma, although it had previously been higher. During the last century the eruptions increased in frequency. That of 1779 is described by Sir William Hamilton as among the grandest of these phenomena. White smoke like heaps of cotton rose four times as high as the mountain, and spread about it to a proportional extent. Into these clouds stones, scoriæ, and ashes were projected at least 10,000 ft. high. On subsequent days columns of fire shot forth three times as high as the mountain, and large masses of rock were thrown out, one of which was 108 ft. in circumference. The eruption of June, 1794, destroyed the town of Torre del Greco by a stream of lava estimated by Breislak to contain more than 46,000,000 cubic feet, which flowed into the sea in a mass 1,204 ft. wide and 15 ft. high. Eruptions have occurred during the present century in 1804, 1805, 1809, 1812, 1813, 1817, 1820, 1822, 1828, 1831, 1834, 1838, 1841, 1845, 1847, 1849, 1850, 1855, 1858, 1861, 1865, 1868, and 1872. That of 1822 broke up the whole top of the mountain, and formed



A. Astroni. B. Monte Barbaro. M. Monte Nuovo. S. Solfatara.

an elliptical chasm about 3 m. in circumference, and supposed to be 2,000 ft. deep. In May, 1855, floods of lava descended as far as the village of Cercolo, committing great ravages in the cultivated fields. In May, 1858, an overflow of lava almost enveloped the hill on which stands the Hermitage. The eruption of December, 1861, was very violent. Eleven cones opened about ½ m. from Torre del Greco, from one of which flowed a stream of lava which threatened the town. Crevices opened in the streets, and many houses were shattered. In March, 1865, the mountain was also in eruption, and again in December, 1867, continuing until the summer of 1868, when the cone attained an elevation of 4,253 ft. above the sea. On April 24, 1872, a great flow of lava succeeded an unusual outpouring of smoke and flame which had lasted for several months. A large tract of cultivated land was desolated, the villages of San Sebastiano and Massa were destroyed, and many lives lost. The streets of Naples were filled several inches deep with fine black sand. In December, 1875, the mountain again showed signs of activity, and in February, 1876, the disturbances of the instruments in the observatory indicated a speedy eruption, which began in the latter part of March.—Vesuvius stands alone on the plain of Campania, on a base about 30 m. in circumference. The ascent from the bay on the W. side is by a gradual slope for about 3 m. to the base of the cone, where it attains a height of 2,300 ft. above the sea. Surrounding the cone on the N. and E. sides is the semicircular escarpment of Monte Somma, the ancient cone, with precipitous walls on the inside and sloping gradually on the exterior to the plain below. On the S. side also of the cone is a terrace-like projection called the Pedamentina, supposed to be the continuation of Somma. The valley between Somma and the base of the cone is the Atrio del Cavallo, so called because horses are left there by those about to ascend to the summit. The cone rises at an angle of 25° to 40° to an additional height of 1,600 to 1,900 ft., varying greatly after eruptions. After that of 1845 its height above the sea was 3,876 ft., and after that of 1868 4,253 ft., the highest elevation ever reached up to that time. The top of the cone is truncated, the diameter being about 2,000 ft. The interior of the cone, or crater, slopes gradually to a depth of about 500 ft., which also varies greatly after eruptions. The lower strata of Somma are formed of compact tufa, composed of pumice and ashes, interspersed with fragments of limestone. Upon these lie beds of leucitic lava alternating with beds of scoriæ, and intersected by dikes of compact lava. The cone of Vesuvius is composed of concentric layers of lava, scoriæ, and sand, distributed around it with much regularity. According to Lyell, a greater variety of simple minerals are found in an area of three square miles around it than in any other place of the same dimensions on the globe. Prof. Scacchi has reduced the number, once said to be nearly 400, to about 40 species, most of which are found in the ancient lavas of Somma. A meteorological observatory has been established since 1844 on an elevation near the Hermitage, 2,080 ft. above the sea, which contains besides meteorological apparatus delicate instruments for indicating earthquakes. It is now under the direction of Prof. Palmieri. In 1875 the construction of a railway from Naples to the summit of the mountain, over a line about 16 m. long, was begun. Ordinary locomotives are to be used for 14 m., and a stationary engine and endless rope for the remainder of the way. The last division is in two sections, the first of 2,300 yards extending to the Atrio del Cavallo, where the drawing machine and the necessary buildings will be placed, and the other of 1,200 yards ending a few steps from the crater. The station in the Atrio del Cavallo will be 21 ft. under the lava, and the rails are so guarded that the current of lava in case of an eruption will be turned from them.—The wine called Lachrymæ Christi is produced on the slopes of Vesuvius, where also are most of the market gardens which supply Naples with vegetables.—See Schmidt, *Vulcanstudien* (Leipsic, 1874); Palmieri, *Cronaca del Vesuvio* (Naples, 1874); and Phillips, "Vesuvius" (London, 1874).

VESZPRÉM (Ger. *Wesprim*), a S. W. county of Hungary, partly covered by the Bakony range, and at the southeast bordering on Lake Balaton; area, 1,609 sq. m.; pop. in 1870, 201,434, mostly Magyars. The surface is mountainous or hilly, and the soil productive; good pastures for cattle, sheep, and swine abound.

The rivers are insignificant. The capital, Veszprém, is situated near the N. extremity of Lake Balaton, 60 m. S. W. of Buda; pop. in 1870, 12,002. It has a fine cathedral and episcopal palace, a Piarist college, a gymnasium, and considerable trade.

VETCH, or **Tares,** the name of plants of the genus *vicia*, which is the ancient Latin name. The genus, which belongs to the *leguminosæ*, is closely related to the pea and lentil, from the first of which it differs mainly in the more numerous leaflets and the character of the style, and from the other in the shape of the seeds. There are several native and introduced species in this country. The vetch of agriculture is *V. sativa*, which has been so widely disseminated by cultivation that its native country is not known, but is supposed to be southern Europe. In cultivation it is annual or biennial, according to the time of sowing; the stems are 1 to 2 ft. long; the leaves have 8 to 14 leaflets, varying in shape from linear to obovate, notched and furnished with a point at apex, the terminal leaflet replaced by a tendril; the purple flowers are sessile, solitary, or in pairs, and succeeded by a narrow pod 1 to 2 in. long, with 10 to 12 globular seeds. The vetch is much cultivated in Europe as a fodder plant, the fondness of animals for its herbage being sustained by its analysis, which shows it to be quite the equal of clover in nutritive principles. The seeds are a favorite food with poultry and pigeons, and are sometimes used as human food; but they are very indigestible. Winter and spring tares are merely strains produced by the time of sowing; if sown in late summer or early autumn, the crop is harvested the next year; if in spring, it is cut the same year. The vetch has never become popular with American farmers, and it is but rarely cultivated.

Vetch (Vicia sativa).

VETERINARY SCIENCE (Lat. *veterinarius*, pertaining to domestic animals). Veterinary medicine was studied among the ancient Egyptians, Arabs, Parsees, and Hindoos, and it attracted considerable attention among the ancient Greeks. Hippocrates and Aristotle describe maladies of the domestic animals, and 600 years later we find systematic Greek works on veterinary medicine. The science was virtually lost in the destruction of the eastern empire, and only began to revive in the end of the 16th century, when Carlo Ruini published his work on the anatomy of the horse. But little real progress was made till 1762, when the prevailing epizoötics among farm animals led to the establishment of the Lyons veterinary college, speedily followed by the founding of similar institutions in every country of Europe. In the 19th century especially the earnest study of comparative anatomy and physiology, and the careful investigation of animal diseases, and of the contagions and parasites which are intercommunicable among the lower animals and between them and man, have opened up a new path of usefulness for veterinary medicine, advanced the science of comparative pathology, and added a most valuable chapter to the doctrine of prophylaxis. As at present existing, veterinary science embraces the anatomy, physiology, hygiene, dietetics, and general care of domestic animals, together with their diseases, therapeutics, and prophylaxis, the philosophy of breeding, shoeing, sanitary principles of building, drainage, and ventilation, the influence of soils and seasons on the food, water, and air, the effects of climate on the animal economy, the laws of contagion, the development and metamorphoses of parasites, &c. I. EPIZOOTIC INFLUENZA. This is a specific typhous fever, occurring epizoötically and complicated with inflammation of the mucous membrane lining the air passages, or less frequently of the lungs, pleuræ, pericardium, liver, bowels, muscles, or joints. It is described as seen in horses, A. D. 330, by the Greek veterinarian Absyrtus, and in the course of the last two centuries has occurred simultaneously in man and horse no less than 20 times. Less frequently it has attacked other animals as well, particularly dogs and cats, while in the great majority of cases it has confined its ravages to a single genus. It was formerly thought to fall on a whole continent or country instantaneously, but a careful study of its outbreaks generally discloses a steady advance over a continent for a period of months or even a year. The American epizoötic of 1872 advanced from place to place with a rapidity varying according to the celerity of communication, extending along the lines of railroad, and attacking first the large cities, later the smaller ones, and finally the villages and isolated farms, and frequently pursuing a retrograde course from the cities and railroads into the adjacent country. The whole country finally suffered, excepting such places as were protected against the introduction of strange horses. Thus La Paz was saved by the gulf of California, Vancouver island by a rigid exclusion of horses and mules, Prince Edward island from its being unapproachable by reason of ice, and Key West, Hayti, and Jamaica by their insular position, while Cuba suffered because of imported American horses. The disease was finally arrested at Panama, where the state of the country forbids the use of horses. It reached the Pacific coast not at San Francisco, but at Santa Barbara by the line of stages from the mining regions of Nevada. It took nine months to travel from Toronto to British Columbia, and eleven to reach San Salvador. Nothing but contagion will account for the manner in which the epizoötic spread, though a considerable latitude must be allowed for the conveyance of the germs through the atmosphere. The alleged propagation by ozone is incompatible with its severity in cities, where this agent is usually absent. The origin of the epizoötic is very obscure. The only peculiarity of the month preceding the outbreak at Toronto was an unusual number of thunder storms.—Incubation extends from one to three days. The attack is usually remarkably sudden; hence the names *Blitzkatarrh*, *la grippe*, &c. A horse which half an hour before seemed in robust health may suddenly droop his head, ears, and lips, partially close his eyes, and stand with one or two legs semi-flexed to find relief from his weariness. He maintains one position, or moves unsteadily and reluctantly with arched back and cracking joints. The hair is erect, the skin tender, the nose and extremities cold, and there may be trembling or even nervous jerking. Sometimes the prostration is much less marked, and a cough may be the main or only symptom for a time. It is dry, husky, and frequent, attended with accelerated breathing, increased temperature of the body, hot clammy mouth, rapid compressible pulse, scanty high-colored urine, and hard mucus-covered dung. The membranes of the nose and eye are reddened, often with a tinge of brown or yellow (pinkeye); and the ear placed over the lower end of the windpipe detects an unusually loud blowing murmur. In slight cases a watery discharge from the nose changes into a white muco-purulent one, the cough becomes loose and easy, fever subsides, and recovery ensues. More frequently, toward the third or fifth day the cough becomes deep, painful, and paroxysmal, pulse and temperature rise, appetite becomes fastidious, eyes swollen, red, and watery, nose livid, with spots or patches of brown or yellow or of blood-staining; swallowing is painful, water being returned through the nose, and the throat tender to the touch. The chest is involved, and if the lungs are implicated there is a want of resonance on percussion over the affected part, and a fine crepitation when the ear is applied; if the pleuræ suffer, there is extreme tenderness when that part of the chest is touched, and a low rubbing sound, which soon gives place to silence and dulness of percussion up to a certain level. If the abdominal organs are attacked, there is great torpor and stupor, tense tender belly, with dusky mucous membranes, and yellow, brown, or red urine, with small weak pulse, quick catching breathing, weak painful cough, and costive bowels, one or two balls being passed rather frequently but with much straining and coated with mucus. In fatal cases prostration becomes extreme, breath fetid, anus puffy and relaxed, dung soft, bloody, and slimy, pulse imperceptible, eyes sunken, limbs deathly cold, and debility extreme. Rheumatism, dropsy, paralysis, and inflammation of the eyes are occasional complications. In the treatment a warm, airy box, comfortable clothing, and laxative and easily digested food are essential. Relieve costiveness by copious injections of warm water or two or three drachms of aloes, and follow up with mild febrifuge diuretics (liquor of acetate of ammonia 3 oz., extract of belladonna 1 dr.), repeated twice daily. In case of severe sore throat, mix the belladonna with chlorate of potash, vinegar, and honey, and smear on the back teeth, to be swallowed at leisure. In extreme prostration, or after the fever subsides, use stimulants (aromatic ammonia, carbonate of ammonia) and tonics (tincture of gentian). The inflamed region may be fomented, wrapped in warm sheepskins, or rubbed with a mixture in equal parts of strong ammonia and olive oil. If the bowels are involved, give a mild laxative (olive oil, ½ to 1 pt.), with mucilaginous drinks and anodynes (opium ½), the last two being continued twice a day. The other complications must be met as they appear, and according to their indications. II. STRANGLES, or DISTEMPER. This is a fever of solipeds, attended with nasal catarrh and swelling and abscess between the bones of the lower jaw, or less frequently in groups of lymphatic glands elsewhere, or in some internal organ (lungs, kidneys, brain, &c.). It especially attacks the young, though no age is exempt, and is largely precipitated by change of feeding, work, heats and chills, hot impure stables, emigration to a new locality and climate, and other results of domestication. The irritation attendant on teething and shedding the coat is not to be forgotten. Contagion is a further cause. Second attacks are unusual unless the subject has been removed into a new district in the interval. The disease usually sets in slowly, the animal appearing to be thriving badly for a time, and losing his accustomed energy. Then a cough sets in, with redness of the nasal mucous membrane, watery discharge from nose and eyes, slavering, fever, costiveness, scanty, high-colored urine, and thirst. Then a uniformly smooth, hot, painful swelling rises between the branches of the lower jaw, or beneath the ear, gradually softens in the centre, and bursts, discharging a white creamlike matter. The nasal discharge has meanwhile become thick, white, and abundant, and swallowing and even breathing may be difficult until the abscess bursts. The rupture of the abscess is the signal for improvement, the sac gradually contracts and heals out, the general health is restored, and the animal thrives better than before the illness. In treatment the aim must be to support the strength, and favor the formation of matter between the jaws. Feed liberally on boiled oats or barley or warm bran mashes, to be eaten from a nose bag, and poultice or assiduously foment the swelling until nearly ready to burst, when it may be opened with a lancet, and the fomentations continued at intervals. Medicine is rarely wanted. When the matter forms in unwonted situations the treatment will not differ, and the danger to life will depend on the importance of the parts involved. (See also BOTS, and GLANDERS.) III. DISEASES OF BONES. Some of the most important maladies of the horse originate in inflammation of bony tissue. As types the familiar bone spavins, splints, and ringbones may be referred to. All are alike due to some injury of the bone or of its fibro-vascular covering, causing exudation of lymph from the vessels and the hardening of this lymph by the deposition of earthy salts. All bone is permeated by minute blood vessels, around which and between the concentric bony plates are rows of microscopic particles of soft animal matter (nuclei), which preside over the nutrition of the part. The vessels are mainly derived from the fibrous membrane investing the bone. When inflamed these vessels throw out lymph, but most abundantly on the surface, where swelling can take place most readily, and this, raising the fibrous covering, drags out the vessels and nuclei somewhat from the bony canals, so that when these latter resume their normal functions they transform the lymph into a bony material. This is the explanation of the development of most of these bony swellings. Where sinews are attached to bones, undue traction upon them tends equally to draw out the vessels and nuclei from the surface and to build up new bony tissue, while earthy salts are at the same time deposited in the substance of the tendon to some distance from the attached end.—*Spavins* are bony deposits on the antero-internal aspect of the lower part of the hock joint, where the great strain and compression come in rapid paces and in heavy draught. The joint is here provided with an extra tier of bones and two additional layers of elastic cartilage to ward off injury; but too often these prove insufficient; the nutrition in the small bones and on their surfaces is deranged; lymph is exuded, and finally consolidates two or more of the small bones into one solid mass, and abolishes the slight gliding movements and resiliency naturally resident in the joints between them. Then if the inflammation is allowed to subside, the new structure becomes firmly consolidated, and lameness disappears. Spavins occur mainly in joints that are narrow at their lower part, alike when viewed from before backward and from side to side, in overworked young horses, and in such as suffer from impaired health, faulty nutrition, or rheumatic taint. The swelling is generally best seen by standing about two feet to one side of the shoulder and looking across the lower part of the inner side of the joint. It should also be compared with that of the opposite limb, examining with eye and hand. The sudden catching up of the limb, or the imperfect bending of it in progression, the stiff awkward movement in turning, and the improvement in most cases after the animal has been driven for some distance, are familiar to every horseman. In the early stages of spavin with heat and tenderness, soothing measures should be adopted to subdue inflammation and check deposit, thereby obviating the danger of fixing the joint. Hot fomentations, cold wet bandages, or astringent and arnica lotions, with a dose of physic and rest, are often sufficient, though if lameness is very great a high-heeled shoe will keep the joint easier. Later, when local inflammation has greatly moderated, active blistering and rest may remove the remaining irritation and secure consolidation of the exudate. As a blister, Spanish flies or iodide of mercury (one part to four of lard) will usually serve a good purpose. When there is little or no external swelling or tenderness, but ulceration of the opposing surfaces of the small bones in the interior of the joint, nothing succeeds so well as firing followed by a long rest.—*Splints* have a similar origin with spavins, but appear on the inner side of the shank bones of the fore limbs, as being nearest the centre of gravity, and the point where concussion especially tells. They usually begin on the inner splint bone, which extends from the knee down for about three fourths of the length of the canon. Inflammation is set up, and the resulting exudate becoming ossified usually binds the two bones together and remains as a permanent enlargement, but without inducing lameness after it is consolidated throughout. But if the animal is kept at work, renewed injury is inevitable; the structures being now soft, irritable, and susceptible, new layers of lymph continue to be exuded and consolidated into bone, and thus a splint, like a spavin, may increase to almost any size. While thus growing lameness is almost necessarily present, and is greatly aggravated by trotting on hard ground, whereas it may not be shown at all on a soft surface. By standing in front of the patient, the enlargement on the inner side of the limb is easily seen, and by passing the finger or thumb down the slight groove between the shank bone and the splint, it is distinctly felt. It is usually warm and tender. Splints are treated exactly like spavins, by rest and soothing applications in the early stages, followed by blisters and even firing. In both the recent deposit which is still soft may be largely removed, but old standing bony enlargements are permanent. In each the lameness is often greatly aggravated by the tension of the fibrous membrane over a rapidly growing swelling, and in spavin by the increased strain thrown on a sinew which passes over the seat of enlargement; in such cases a skilful division of these structures with a narrow-bladed knife, which will make little more than a puncture in the skin, is followed by the best results.—*Ringbones*, which appear as hard swellings on the bones between the fetlock and hoof, generally take their origin at points where the lateral ligaments of the joints are attached, though they may arise from concussion and injury to the front as well. In these, as in splints and spavins, the inflammation may subside, the exudate harden into bone, and all lameness disappear, so that the swelling remains only as an eyesore and not a real injury. But from the constant strain on the lateral ligaments, when standing as well as at work, the inflammation is far more likely to be kept up, and the enlargement to go on increasing, making ringbones more dangerous than splints or spavins. Again, if they extend over the joints, as they often do, they give rise to a permanent stiffness and lameness, by abolishing the considerable movements normally effected in these. The treatment of ringbones is therefore far less satisfactory than that of splints and spavins. It proceeds on the same principle, first by soothing and antiphlogistic applications when inflammation is acute, and later by blistering or firing when its severity is somewhat moderated. The counter irritation must usually be more severe and repeated than in the other affections, and deep firing in points must often be resorted to.—Any of the above named forms of bone disease may be primarily dependent on a constitutional infirmity with impaired nutrition of the skeleton, and in such cases an improvement of digestion and general tone must first be secured. Such general infirmity is usually betrayed by the coexistence of several such causes of unsoundness in the same animal (splints, spavins, ringbones, navicular disease, sprains, &c.), by the passage of an excess of earthy salts (phosphates) in the urine, and by a general lack of energy and endurance. IV. SHOEING AND DISEASES OF THE FEET. A great majority of diseases of the feet take their origin in faulty modes of shoeing. The hoof is made up of horny tubules, all excepting some of those of the frog running from above downward and forward. Near the quick these are wide and open, filled with liquid, and surrounded by a soft, moist, horny substance; but in approaching the surface they become finer, closer, and encircled by horn of almost flinty hardness. The tubes of the hoof wall extend from the coronet to the lower wearing border, where they are closed by attrition. Those of the sole are covered by thick horny scales or flakes, with a fine powder between them and the tough elastic horn, and effectually protecting the latter from desiccation and mechanical injury. In the healthy state therefore the whole hoof is well provided against evaporation, drying, and shrinking. But the case is altered when the tubes of the hoof wall are laid open with the rasp, and those of the sole and frog with knife and buttress. Then the moisture is rapidly exhaled, the horn dries and shrinks, the heels curl inward, and the sole becomes more arched, drawing in the lower border of the hoof wall. The sensitive parts beneath are absorbed under the pressure, and distortion and weakness are inevitable results, even if active disease is for a time escaped. A free use of hoof ointments will to some extent obviate the evil, though they make but a poor substitute for nature's admirable protection. The preservation and preparation of the foot is of far more consequence than the form of shoe. The hoof should be interfered with as little as possible, save where the shoe is to rest. This part should be pared or rasped until the elastic horn is reached, and so as to leave a smooth bearing surface, extending on the sole to a distance of perhaps half the thickness of the hoof wall. The two sides, inner and outer, should be of uniform height at all corresponding points, and the heel and toe left of an elevation according with the natural form of the particular foot. Usually the cutting must be almost entirely confined to the toe. While avoiding the paring of the tough elastic horn of the heel, we must equally avoid leaving hard thick flakes of dead horn, which can only act as foreign bodies and bruise the part. The outer edge of the hoof wall may be slightly rounded with a file, to obviate splitting. The foot having thus been prepared with corresponding height on both sides, and in a way to prevent any distortion of the bones and joints of the limb from their natural direction, the next point is to adapt the shoe to the wearing surface. The upper surface of the shoe should be perfectly level, unless a very gentle curve is given from heel to toe, and the bearing on the hoof should be uniform throughout, as unequal pressure will tell sooner or later on the foot, or on the bones and joints above. Fitting the shoe at a dull red heat is hurtful to the horn, but of two evils it is preferable to unequal bearing. For perfect fit it is better to have the shoe coarsely fullered, and to drive the nails rather low as tending to injure less horn, and the hold taken should be gradually less in approaching the heel, especially on the inner side. The nails should be drawn up so as to hold the shoe firm, but no more; and in riveting, the transverse groove usually made with the rasp should be avoided, though a slight notch may be made with the knife beneath each nail, to receive the clench. In filing off any roughness of the clinches, avoid touching the hoof. Finally, remove the shoe before the hoof grows over it, and especially before the growth of the toe has drawn it forward so that it sets in on the heels.—*Navicular Disease.* This is a disease of a small bone situated beneath the coffin joint, and serving as a pulley over which plays the flexor tendon of the foot. This tendon and its synovial sheath also participate in the disease. These structures lie directly above the anterior part or body of the horny frog, which thus serves as a protecting cushion or pad. Besides the general faults of nutrition predisposing to bone disease, rheumatism, hard work, faulty shoeing, and neglect of or injury to the feet contribute to its development. It is particularly liable to complicate injuries of the heel, the inflammation extending by proximity to the bursa of the flexor tendon and the navicular bone. Hence rapid paces and the system of shoeing are largely chargeable with the disease. In France, where the shoeing generally is good and protective, the affection is comparatively rare; in England the rapid paces and the systematic weakening of the feet in shoeing render it exceedingly prevalent; but in America, through the fondness for trotting, poor shoeing, and rough, uneven roads, there are incomparably more cases than in either. The continued idleness of horses during our rigorous winters, broken by occasional fast drives, and the general disorder caused by an overfeed of grain, or a drink of iced water when hot and exhausted, are not to be overlooked. The affected foot may be pointed eight or ten inches in front of the other, with the heel slightly raised, for months before actual lameness appears. The horse steps short, stumblingly, and on the toe when first brought out, but the lameness diminishes or disappears after he has gone a mile or two. It is worse again when cooled down after a long or hard drive. It may also appear at work as an occasional stumble, or a temporary dropping on the sound foot. The shoe is worn at the toe, and the foot is warm at its posterior part, and steadily shrinks so as to be visibly smaller than its fellow. There is flinching when the sole is tapped with a hammer on each side of the body of the frog or on the wall in the region of the quarter. The same results from pressure of the thumb over the flexor tendon, behind the pastern, as far down as can be reached in the hollow of the heel. The wasting of the muscles of the limb and shoulder from disuse deludes many with the idea that the lesion is resident there. Treatment is not often satisfactory, except in recent cases. To soothe inflammation, give a dose of physic, remove the shoe, shorten the toe, leaving the heel of its full height, keep the horse standing throughout the day in cold water or a puddle of wet clay reaching to the top of the hoof, and apply a mild blister to the front and sides of the pastern, repeating it when the scab from the first has come off. Obstinate cases will sometimes recover under the action of frog setons and a long run in a wet pasture, while for those that are otherwise useless the sensitive nerves going to the foot may be divided, when all pain and lameness will cease. But this is only advisable in chronic cases, when the best system of shoeing can be secured, when the feet can be cleaned and examined on each return from work, and when they can be kept covered with wet swabs while standing indoors.—*Founder* is an inflammation of the secreting structures of the foot, but especially of the laminæ which connect the hoof wall with the sensitive parts anteriorly. It results from direct injury, as over-exertion on hard roads, blows, bruises, freezing, pricks or binding with nails, unequal pressure of the shoe on different points, or the long strain on the feet during a sea voyage; or it may result from a sudden chill, a drink of cold water when heated and fatigued, an overfeed of grain, especially if new or only partially ripened, an overdose of purgative medicine, or as a sequel of disease of the lungs or other internal organ. When not caused by direct injury to the foot, it is usually introduced by fever, staring coat, or shivering and general stiffness and soreness, without at first any great tenderness of the feet. Soon the disease concentrates itself in the anterior part of the fore feet (rarely the hind), and the patient leans back, rests on his heels, and brings his hind feet forward to bear as much weight as possible. If urged to move, he sways back, dragging the fore feet on the heels, or lifts both at once and comes down on the heels only. The feet are hot and extremely tender to the hammer or pincers, and the patient resists all efforts to lift them. The pulse is rapid and hard, the breathing hurried, and the skin often perspiring. In the mild forms there is less fever and local suffering, but in all cases the walking on the heels and the heat and tenderness of the feet are characteristic. The preliminary stage of general stiffness may often be cut short by a free perspiration induced by wrapping in a blanket wrung out of hot water and closely covered by several dry ones, or by heavy dry clothing and full doses of aconite, lobelia, or tobacco. Others attain the same end by walking the patient, barefoot or with broad-webbed bar shoes, on a newly ploughed field. But if some inflammation has set in, the feet must be unshod, and enveloped in large, soft, warm poultices; a laxative should be given if the bowels are not too irritable, followed by sedatives and cooling diuretics, and the patient coaxed or even compelled to lie down. When nearly well, a slight blister round the coronet, and a moist clay paddock, or hoof ointments, may perfect the cure.—*Corns* are common as simple bruises of the heel (usually the inner), often resulting in high strong heels, from accumulation of dry hard flakes of horn when the shoes have been left on too long; in weak ones from undue paring of the sole between the wall and the bars; and in all from the pressure of stones or hardened earth or clay, or the setting in of the shoe when drawn too far forward by the growth of the toe. If of old standing, there is often a horny swelling in the seat of the bruise, pressing inward on the quick. Other results are distortion of the heels of the coffin bone, ossification of the lateral cartilages which prolong that bone posteriorly, navicular disease, and the formation of matter which tends to burrow in different directions, forming fistulæ and causing extensive destruction of the soft parts. Corns cause marked lameness, pointing of the foot, with slight elevation of the heel, and a short, stilty, stumbling gait. Testing the affected heel with pincers or hammer elicits signs of tenderness, and the horny sole in the angle of the heel is marked with red points and patches, from extravasated blood. If matter has formed, the patient will often hesitate to touch the ground even with the toe, and soon there is swelling and tenderness at the coronet where the pus is about to escape. Should the injury not exceed a simple bruise, it may be allowed to grow out. A bar shoe may be applied so as to rest on the frog, and remove the pressure from the diseased heel, while the patient is allowed to stand in water, or with wet swabs and linseed stuffing for the sole, until inflammation subsides. The shoe must be removed before it settles down, and reapplied so as to protect the heel as before. If matter has formed, pare down the sole until it escapes, remove all horn detached from the quick, thin the edges of the adjacent horn, apply a poultice for a few days, then apply a bar shoe with leather sole over an abundant stuffing of tar and tow. In low weak heels with extensive disease of the posterior part of the coffin bone, and above all with ossification of the lateral cartilages, the recurrence of corns can hardly be prevented, although careful shoeing with bar shoes, resting very lightly on the heels, will do much to mitigate their severity.

V. BREAKING AND TRAINING OF HORSES. In careful hands the colt should be led and handled while still with his dam, but should not be made a general pet and plaything. Many of the most incorrigible horses have been pets as foals, and learned at this early age to retaliate in their play. To halter a colt, he should be driven into a narrow place in stable or yard between two old steady horses, that will virtually hold him until the halter or bridle has been got on. All sudden movements are to be avoided.—*Training* to bring a horse into condition for hard work consists in the removal of all superfluous fat, and the development and hardening of the muscles. The best condition is not to be attained by a training of a few weeks or months, and trotters rarely reach their highest speed until years after they are matured. The colt intended for this training should be fed on grain from the time he leaves his dam, and should have free scope for exercise and development. The final treatment is by sweating, physic, and graduated exercise. Sweating is employed mainly to get rid of superfluous fat, and may be secured by active exertion, by clothing, or by the Turkish bath. The duration and frequency of the sweats must vary with the subject, but the liquid should always be scraped off, and the horse rubbed dry, and walked out in light clothing until he cools. A dose of physic is useful in reducing fat, counteracting plethora, and cooling the limbs, but is especially beneficial in clearing away irritants and accumulations from the intestines, and improving appetite and digestion. But it is always dangerous in injudicious hands, and should never be repeated unless the state of the limbs or of the general health demands it. Exercise should gradually increase from walking to trotting, and cantering or galloping, according to the development of condition and the use to which the animal is to be put. Feeding must be liberal upon hay and oats, the latter being steadily increased and the former diminished as the more active work is demanded. In perfectly sound horses with clean limbs, brans may be added with good effect.—See Bouley, *Traité de l'organisation du pied du cheval* (Paris, 1851); Bouley and Reynal, *Dictionnaire de médecine vétérinaire* (vols. i.–x., Paris, 1856–'73); Rey, *Traité de maréchalerie vétérinaire* (Paris, 1865); Chauveau, *Traité d'anatomie des animaux domestiques* (Paris, 1871; translated into English by George Fleming, "Comparative Anatomy of the Domesticated Animals," London and New York, 1873); Colin, *Physiologie comparée des animaux* (Paris, 1871); Saint-Cyr, *Traité d'obstétrique vétérinaire* (Paris, 1874); Tabourin, *Matière médicale* (Paris, 1875); Hering, *Handbuch der thierärzlichen Operationslehre* (Stuttgart, 1866); Röll, *Lehrbuch der Pathologie und Therapie der nutzbaren Hausthiere* (Vienna, 1869); Rohlwehs, *Allgemeines Vieharzneibuch* (21st ed., remodelled by H. Renner and M. Rothermel, Berlin, 1874); Finlay Dun, "Veterinary Medicines, their Actions and Uses" (Edinburgh, 1864); and George Fleming, "A Manual of Veterinary Science and Police" (2 vols., London, 1875).

VETIVER (Fr., from the East Indian *vitivayr*). Several grasses of the genus *andropogon*, which is largely represented in this country, have aromatic properties in a marked degree; in some cases these are important enough to make them or their products articles of commerce. The oil of lemon grass, so much used in modern perfumery (see LEMON GRASS), is from *A. schœnanthus*, and the roots of *A. muricatus*, as vetiver, are employed by the French perfumers. The last named species, which is very common in India, where it is known also as *kus-kus*, grows from 3 to 6 ft. high, with leaves 3 ft. long; no part of the plant has any marked odor, except the root; this consists of much-branching fibrous rootlets, which in the imported article are clumps of a few inches to a foot long; they have a strong odor, recalling that of myrrh, but more pleasant, which depends upon a resinous matter. In India the roots are used to preserve stuffs and clothing from insects, and are interwoven into screens of lattice work which are placed in the windows; when wetted they give to the air which passes through them a pleasing odor; palanquins are perfumed in the same manner, and the roots are used for making perfumed baskets and other small articles. As early as 1103 the root was received in India in payment for taxes.

VETO, a Latin word, signifying "I forbid," which has been introduced into the political language of modern nations to signify the act by which the executive power refuses its sanction to a measure proceeding from the legislature. The first instance of the use of this power was by the tribunes of the people in Rome, who, by pronouncing the word *veto*, could render of no avail the decrees of the senate or the proceedings of the magistrates. Under the ancient Polish constitution any single member of the diet, by the use of the *liberum veto*, saying *Nie pozwalam* (I do not allow), could hinder the passage of any measure. At the beginning of the French revolution the national assembly, in forming the constitution, allowed the king a conditional veto only; but the absolute veto was restored to the monarchy after the fall of Napoleon. The sovereign of England has theoretically a veto upon the measures of parliament, but it is a power which has not been used since 1707. In Norway the king has a veto; but if three successive storthings pass the same measure, it becomes a law in spite of the veto. In Sweden and the Netherlands the king has a full veto, and in other European countries there is an equivalent authority wherever the assent of the monarch is necessary to a law. The president of the United States has a veto power, which has very frequently been exercised; but a majority of two thirds in each house of congress is sufficient to pass any measure over the veto. A similar conditional power over the acts of their respective legislatures is given to the governors of the several states, with the exception of Delaware, North Carolina, Ohio, Rhode Island, and West Virginia. In several of the states the veto may be overruled by a majority vote, but in most of them a majority of two thirds is required. Mayors of cities generally have a like power.

VEUILLOT, Louis, a French author, born at Boynes, department of Loiret, in 1813. He is the son of a poor cooper, obtained a place in an attorney's office in Paris, and at the age of 19 his articles in the *Écho de la Seine-Inférieure* involved him in two duels. At the end of 1832 he became the editor-in-chief of the *Mémorial de la Dordogne*, at Périgueux. In 1837 he went to Paris as editor of the *Charte de* 1830, founded by the ministry; and when that journal failed, he became principal editor of the *Paix*. Hitherto he had been distinguished for boldness and skepticism; but having in 1838 visited Rome during Holy Week, he returned to France a zealous Catholic. In 1842 he went to Algeria as secretary of Gen. Bugeaud, and on his return became chief clerk in the ministry of the interior. In 1848 he became editor-in-chief of the *Univers*, on which he had been employed several years. While advocating extreme ultramontane views, he sided with the abbé Gaume in denouncing the use of the pagan classics in the Jesuit and other colleges, and with Padre Ventura in combating the Jesuit philosophy as too rationalistic. His journal was interdicted in many dioceses, and in 1853 the bishop of Orleans expressly forbade his clergy to read it. In 1860 it was suppressed by the emperor, but was allowed to reappear in 1867 with Veuillot as chief editor. During the discussions which preceded the council of the Vatican, the *Univers* was the foremost organ of the infallibilists. Veuillot resided at Rome during the council as the chief correspondent of his paper. He has written numerous works, relating principally to the tenets of the Roman Catholic church, and often bitterly attacking everything that came in conflict with what he conceived to be ultramontane doctrines and interests. His latest work is *La vie de Jésus-Christ.*

VEVAY, or **Vevey** (anc. *Vibiscum*), a town of Switzerland, in the canton of Vaud, 10 m. S. E. of Lausanne; pop. in 1870, 7,881, chiefly Protestants. It is beautifully situated at the mouth of the gorge of the Veveyse, on the N. E. margin of the lake of Geneva opposite a range of mountains, is built in a triangular form, and has a large market place lined with fine buildings. St. Martin's church contains the tombs of the regicide Ludlow and of Broughton, who read the death sentence to Charles I. The other principal church is St. Clara's, and there is an English chapel. The corn magazine is remarkable for its marble pillars. A marble bridge spans the Veveyse, and the lake shore is provided with quays. Vevay is the centre of an active transit trade. A vintage festival, traced by some authorities to the worship of Bacchus in the days of the Romans, and by others to mediæval monastic usages, is held at intervals of 15 or more years; the last was held in 1865. Vevay is associated with many celebrated personages, and especially with Jean Jacques Rousseau, whose favorite inn, in the Grande Place, has been converted into a coffee house. The scenery increases in magnificence within a few miles N. E. of Vevay, and attracts in summer multitudes of tourists, not a few of whom become permanent residents in consequence of the fine climate and the cheapness of living.

VIARDOT. I. Louis, a French author, born in Dijon, July 31, 1800. He studied law in Paris, and wrote for the newspapers. In 1838 he joined Robert in managing the Italian opera, became sole director in 1839, and brought out Mario and Pauline Garcia, whom he married in 1840. In 1841 he joined George Sand and Pierre Leroux in founding the *Revue indépendante*, and he afterward accompanied his wife in her artistic journeys. His works include *Essai sur l'histoire des Arabes et des Maures d'Espagne* (2 vols., 1832); *Études sur l'histoire des institutions et de la littérature en Espagne* (1835), translated into Spanish; *Souve-*

nirs de chasse (1849; 6th ed., 1854); *Histoire des Arabes et des Maures d'Espagne* (2 vols., 1851); *Les merveilles de la peinture* (1868 *et seq.*); and various works on Spanish and Italian art and on European art collections. He made many translations, comprising *Don Quixote* and novels by Cervantes, Toreno's history of the rising in Spain (5 vols., 1838), and select Russian works by Gogol, Pushkin, and Turgeneff (1853–'60). An English edition of his works on Italian art appeared in 1870, entitled "Wonders of Italian Art." **II. Michelle Pauline Garcia,** a French vocalist, wife of the preceding, born in Paris, July 18, 1821. She studied vocal music under her father, Manuel Garcia, and at a later period Liszt perfected her on the piano. In 1825 she was taken with the Garcia troupe to America, and after their return in 1828 she sang in the concerts of her sister Mme. Malibran. She first appeared in opera at London in May, 1839, as Desdemona in Rossini's *Otello*, and in *La Cenerentola.* She married M. Viardot in 1840, and with him made tours to the principal European capitals. In Paris she created in May, 1848, the character of Fidès in *Le prophète*, one of her masterpieces, in which she appeared at Berlin, St. Petersburg, and London. In 1860 she had a brilliant success at the Théâtre Lyrique, Paris, in Gluck's *Orfeo.* She possesses a mezzo-soprano voice of remarkable compass and elasticity, and is able to sing with almost equal facility in French, Italian, German, Spanish, and English; and her dramatic genius is remarkable. She has composed a short opera, *L'ogre*, for which Turgeneff wrote the text, performed in 1868 during her residence in Baden-Baden, and another in two acts, *Le dernier magicien*, performed in 1869 at the court of the grand duchess of Saxe-Weimar. Mme. Viardot has been for some years a professor of music at the conservatory of Paris.

VIATKA. I. An E. government of European Russia, bordering on Vologda, Perm, Ufa, Kazan, Nizhegorod, and Kostroma; area, 59,114 sq. m.; pop. in 1870, 2,406,024, including Tartar tribes and about 50,000 Mohammedans. The surface is mountainous in the east, where ramifications of the Ural range extend, and level or undulating in other parts. The principal rivers are the Kama, an affluent of the Volga, dividing it from Ufa, and its tributaries, the Viatka, Tcheptza, and Kilmez, all navigable. The climate is severe. Grain, flax, hemp, tallow, honey, and wax are exported to Archangel, and furs, iron, and copper are also produced. Woollen and linen goods and iron and copper ware are manufactured. **II.** A city, capital of the government, on the Viatka, 195 m. N. by E. of Kazan; pop. in 1867, 19,885. It has a fine cathedral and many other churches, a gymnasium, a seminary, important manufactories of woollen and other goods, and extensive silver and copper works.

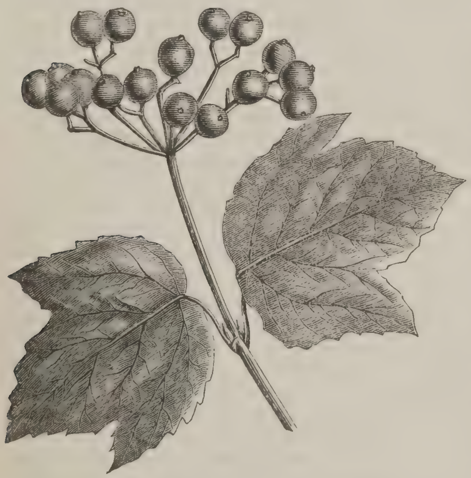
VIBERT, Jehan Georges. See supplement.

VIBORG. I. A S. E. län or government of Finland, Russia, bordering on the gulf of Finland; area, 16,611 sq. m.; pop. in 1872, 276,884, chiefly Karelians. Lake Ladoga partly belongs to its territory, and it contains Lake Saima, which establishes communication between the various watersheds and the gulf. The principal occupations of the inhabitants are agriculture and mining. **II.** A town, capital of the län, on a deep inlet of the gulf of Finland, 74 m. N. W. of St. Petersburg; pop. in 1867, 8,722. It has a gymnasium, a female high school, and a considerable export trade.

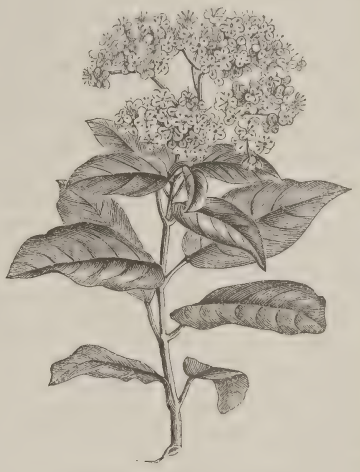
VIBRIO (Müll.), the type of the *vibrionia*, a family of minute colorless organisms, arranged by Ehrenberg and Dujardin among infusorial animals from the possession of apparently voluntary motions, but now generally considered as microscopic plants, compound or confervoid algæ of the tribe *oscillatoriaceæ.* They are exceedingly minute, requiring the highest powers of the microscope to make out any structure; they appear like slender lines, straight or sinuous, composed of minute joints, without any visible organs of motion, though possessing contractility; they seem to be propagated by the formation of new joints and subsequent separation at one of the articulations; their structure is best seen when dried. They appear suddenly in artificial infusions, and grow rapidly in such immense numbers as to form a thick scum on the surface; they are also found in the tartar on the teeth, in purulent discharges, and in other morbid fluids. The species of the genus *vibrio* have an undulatory and sinuous motion, like a serpent; in *spirulina*, which is coiled in a long spiral, the movements are gyratory and oscillating. In *vibrio* there is a single, straight row of filaments, without apparent sheath; *V. subtilis*, about $\frac{1}{430}$ of an inch long and $\frac{1}{24,000}$ wide, is aquatic and found in pools; some of the other species are probably the earlier stages of other unknown algæ.—The so-called "eels" of vinegar and sour paste, sometimes erroneously styled vibrios, are nematoid worms or entozoa; they were once popular microscopic objects. They belong to the genus *anguillula* (Müll.); the *A. aceti* or vinegar eel is $\frac{1}{30}$ to $\frac{1}{17}$ of an inch long, and the *A. glutinis* or paste worm $\frac{1}{15}$ of an inch; their absence in vinegar is due to the freedom from mucilage and the usual addition of a little sulphuric acid.

VIBURNUM, an ancient name of a genus of monopetalous shrubs or small trees of the honeysuckle family (*caprifoliaceæ*), in which there are about 80 species; the majority are natives of North and South America, a few being found in Europe and Asia. The viburnums have opposite and simple leaves, and small white flowers in terminal, flat, compound cymes; the very minute flowers consist of a calyx, the tube of which is coherent with the ovary and five-toothed, a deeply five-lobed spreading corolla, and five stamens; the one- to three-celled ovary is surmounted by a short three-lobed style, and ripens into a one-celled, one-seeded drupe, containing a single flattened stone.

There are about a dozen species in the United States, some of which, in the northern portions at least, form a considerable part of the coppice and undergrowth of woods. In two of our species the flowers upon the margin of the cyme are sterile and their corollas are greatly enlarged, forming a showy border to the cluster; a garden form of one of these, *V. opulus* (also a native of Europe), has all of the flowers sterile and showy. (See GUELDER ROSE.) The other species with sterile flowers is called hobble-bush, for the reason that its straggling reclining branches take root where they touch the ground, and impede the traveller; it is found in cold woods from New England to Pennsylvania, and further south along the mountains; its round-ovate leaves are heart-shaped at base, serrate, 4 to 8 in. across, with the veins and stalk covered with a rusty scurf; the heads of flowers are broad and showy, and the crimson fruit is not edible. This species is named *V. lantanoides* from its resemblance in leaves, though not in flowers, to *V. lantana* of Europe, which is there called the wayfaring tree on account of its frequent occurrence on the roadside; and our shrub is sometimes called the American wayfaring tree. Of the remaining species, without the conspicuous sterile flowers, the following deserve a special mention. The sweet viburnum, or sheep berry (*V. lentago*), is one of the most frequent northern species; it has ovate, strongly pointed, very sharply serrate leaves, with margined petioles; the flower clusters are terminal and axillary, appearing in great abundance in May and June, and have a pleasant fragrance; the oval fruit, shining blue-black, half an inch or more long, is showy, sweet, and edible. This is one of our most beautiful shrubs, and when unmutilated (for cattle are fond of browsing on it) is sometimes a tree 20 to 30 ft. high. It has been successfully used to form an ornamental hedge. Arrowwood is the common name for another abundant species (*V. dentatum*), which is widely distributed; it sometimes reaches 15 ft., but is usually only 5 or 8 ft. high; its leaves, from half an inch to an inch long, have very large and sharp teeth and strong veins; the fruit is bright blue. The maple-leaved viburnum (*V. acerifolium*), which in some parts of the country is called dockmackie, rarely grows above 6 ft., and may be readily mistaken when not in flower for a young maple sapling; its three-ribbed and three-lobed leaves are from 2 to 4 in. long and broad, and irregularly toothed on the margin; the fruit, at first crimson, turns to blackish purple and is inedible; it is very common in rocky woods. The most important exotic species is *V. tinus*, which is not rare as a house plant under the name of laurestinus; it is a native of southern Europe; it has evergreen leaves and clusters of flowers which are rose-colored in the bud, but white when open; it continues long in flower, and is much valued for the house and for decoration.



Maple-leaved Viburnum (V. acerifolium).



Laurestinus (Viburnum tinus).

VICENTE, Gil, a Portuguese dramatist, born about 1470, died in 1557 (according to some, about 1540). He belonged to the nobility, and studied law at Lisbon. His first work was a monologue written in 1502 on occasion of the birth of Prince John, afterward John III., which was recited before the royal family, and pleased the queen mother so much that she requested the author to repeat it at Christmas, adapting it to the birth of the Saviour. From this time he continued to produce dramatic works at the court, and he has been called the Plautus of Portugal and the father of the Portuguese drama. He wrote 42 pieces, consisting of *autos* or miracle plays, comedies, tragi-comedies, and farces, of which 10 were written wholly and 15 partly in Castilian. His works were edited by his son Luiz (Lisbon, 1561), and in an edition of 1585 much was suppressed by the inquisition. A complete new edition has been issued by Barreto Feio and Monteiro (3 vols., Hamburg, 1834).

VICENZA. **I.** A N. E. province of Italy, in Venetia, bordering on Tyrol and the provinces of Belluno, Treviso, Padua, and Verona; area, 1,016 sq. m.; pop. in 1872, 363,161. The principal towns are Vicenza and Bassano. In the north the surface is traversed by several offsets from the Alps, but in the south it is level or undulating. The most important rivers are the Bacchiglione and the Brenta. There are considerable tracts of forest with much valuable timber; abundant chestnut trees furnish food for a great part of the population. The level country is remarkably fertile. A large quantity of silk is produced. Cattle and sheep are numerous. Several coal mines are worked, and silk, linen, and woollen goods, hardware, porcelain, paper, gold and silver articles, and leather are manufactured. It is divided into 10 districts. **II.** A city (anc. *Vicentia* or *Vicetia*), capital of the province, in a fine hilly region, at the junction of the Bacchiglione and Retrone, 37 m. W. by N. of Venice; pop. in 1872, 37,686. To Palladio, who was born here, is ascribed the finest of the eight bridges, and he built many of the celebrated public and private palaces. Among the former are the town hall and the prefecture. The finest square is the piazza dei Signori, in which are the two columns characteristic of most Venetian cities. In the market place is a remarkable belfry 270 ft. high and only 23 ft. wide. Of the 19 churches, the cathedral and the church of S. Lorenzo, and especially Sta. Corona near the Corso, are noteworthy for their architecture and pictures. Palladio began to build in the piazza d'Isola the teatro Olimpico, on the ancient plan, and it was completed by his son; it is now in a rather dilapidated condition. In the museum is a large picture gallery, and there are several gymnasia, a lyceum, a college, and a palace for the resident bishop. The sanctuary of Monte Berico is joined to Vicenza by arcades beginning at the triumphal arch of the Lupia gate; at the foot of it is Palladio's villa, copied in the duke of Devonshire's villa at Chiswick, and described by Goethe as a marvel of splendor. The finest promenade is the Campo Marzio, which contains a triumphal arch and the railway station. The *campo santo* or cemetery is an extensive building with many fine monuments.—Vicentia was a *municipium* of Venetia under the Romans. In the 12th century the city was among the earliest members of the Lombard league against the emperor Frederick I. In 1236 it was devastated by Frederick II. Henry VII. gave Vicenza in fief to the Scala family, and this and other local families were at the head of the government until it passed in 1404 to the Venetians, who recovered it in 1516 after it had been for some time in the hands of Maximilian I. It came into the possession of Austria in 1815. In 1848 Vicenza rose against the Austrians, who bombarded it in May and June, and it surrendered on June 11 to Radetzky.

VICENZA, Duke of. See CAULAINCOURT.

VICHY, a town of France, in the department of Allier, on the right bank of the river Allier, which is here crossed by a suspension bridge, 30 m. S. of Moulins; pop. in 1872, 6,028. It consists of an old and a new town, known as Vichy-la-Ville and Vichy-les-Bains. There are several churches and hospitals, a fine park, a new English park, and a casino consisting of three parts joined by two arcades. It has eight principal springs. (See MINERAL SPRINGS.) The season lasts from May to October. Under the second empire, when the place was greatly improved and enlarged, the annual visitors numbered over 15,000.

VICKSBURG, a city and port of entry of Mississippi, county seat of Warren co., on the E. bank of the Mississippi river, about 400 m. above New Orleans and nearly the same below Memphis, Tenn., and on the Vicksburg and Meridian railroad, 45 m. by rail W. of Jackson, the state capital; pop. in 1850, 2,678; in 1860, 4,591; in 1870, 12,443, of whom 6,805 were colored and 1,416 foreigners; in 1875, locally estimated at 15,000. The site is elevated and very uneven, rising in terraces from the river. The streets are narrow but regularly laid out, and some of them are paved. The court house is a magnificent building, which cost about $150,000. About 3 m. N. of the city is an extensive national cemetery. Steamers run tri-weekly to St. Louis, and almost daily to New Orleans. The North Louisiana and Texas railroad, starting from the opposite bank of the Mississippi, extends to Monroe, La. The Vicksburg and Ship Island railroad is in course of construction. Vicksburg is surrounded by a rich cotton-growing region, and is the principal commercial point between Memphis and New Orleans. About 200,000 bales of cotton are shipped annually. The chief manufactories are one of cotton-seed oil, consuming 500 bushels of seed a day, a rolling mill and foundery, the railroad car works, two machine shops, two breweries, four planing mills, several saw mills, a manufactory of boilers, and several of carriages and wagons and of saddlery and harness. There are two banks, with a joint capital of $250,000; four public schools, with an average attendance of about 1,000, white and colored, besides two Roman Catholic and two private schools; a daily and three weekly newspapers; a city hospital; and eight churches, Baptist, Episcopal (2), Jewish, Methodist (2), Presbyterian, and Roman Catholic, besides three or four for colored people. Vicksburg was settled in 1836 and incorporated in 1840.—As early as January, 1861, immediately after the adoption by Mississippi of the ordinance of secession, the governor of the state planted guns at Vicksburg to detain for examination all steamers passing down the river. The capture of New Orleans in April, 1862, gave the federals virtual possession of the Mississippi to this point, down to which the operations from above had cleared the river. On May 18 a portion of Farragut's fleet, under Capt. S. P. Lee, passing up the river, appeared before Vicksburg, and demanded its surrender on pain of bombardment; this was peremptorily refused, but no bombardment ensued. The fortifications on the river side were strengthened, and in June were held by a confederate force estimated at 10,000. On the 28th Gen. Williams with four regiments and eight field guns came up the river and took position opposite the city on the Arkansas side, and began digging a canal across the narrow isthmus formed by the sharp curve of the river. The design was to form a new channel, and thus leave Vicksburg several miles inland; but the river, which often forms for itself a new channel in a single night, refused to pass through that provided for it, and kept on its old course around the bend. On June 28 Farragut bombarded Vicksburg, and succeeded in passing the batteries with little damage; but he thought the place could not then be taken without the coöperation of an army of 12,000 or 15,000 men. Late in August the river began to fall; Farragut was obliged to descend to New Orleans, and for five months no further operations were undertaken against Vicksburg. Meanwhile the confederates had commenced fortifications at Port Hudson on a high bluff about 120 m. below Vicksburg, nearly midway between that city and New Orleans; these soon became very strong, and it seemed necessary to capture them also in order to hold the whole course of the Mississippi. Gen. Pemberton, a personal favorite of President Davis, was made a lieutenant general, although he had seen little service, and was placed in command at Vicksburg, subject to the orders of Gen. J. E. Johnston, who at that time commanded all the forces in Tennessee and Mississippi. Gen. Grant, who commanded the Union forces in these departments, had late in the autumn penetrated far into Mississippi, and in December had approached Vicksburg with about 40,000 men, Pemberton having about 34,000. Grant then sent Gen. W. T. Sherman to attack Vicksburg. His force, when increased from other quarters, was about 42,000. On the 25th Sherman's troops went in transports up the Yazoo river, which falls into the Mississippi a few miles above Vicksburg, whence he endeavored to make his way through a swampy region intersected by numerous bayous. After several skirmishes, it was found impossible to force a passage through the swamps, which were passable only by narrow causeways, commanded by batteries, and the attempt was abandoned on Jan. 1, 1863. The entire Union loss was 191 killed, 982 wounded, and 756 missing; that of the confederates was about 150 in all. On the 4th Sherman was superseded in this command by Gen. McClernand, though retaining that of his own corps, the 15th. Grant soon after took command of all the forces operating against Vicksburg. During several weeks he made repeated attempts to find some means by which his army could go by water to some point below the place, and attack it in the rear from the south. The first canal across the isthmus having proved a failure, he undertook to cut a second one further inland; but that was likewise useless, and Grant determined to march the bulk of his army by land, on the western side of the Mississippi, to a point below, cross the river, strike eastward to Jackson, the state capital, and then turning west move upon Vicksburg, taking it in the rear. Finally, on April 30, after an unsuccessful attack on the 29th upon Grand Gulf by Porter's gunboats, which had passed the batteries at Vicksburg, the army reached a point opposite Bruinsburg, where a crossing was effected, and the march toward Jackson began. On May 1 a brisk engagement took place at Port Gibson, 12 m. N. E. of Bruinsburg; the confederates were driven off with a loss of about 700. Grant had left Sherman behind at Milliken's bend, above Vicksburg, to make a feint from that quarter, after which he was to follow on and rejoin the main army. This having been done, the whole resumed their march toward Jackson. Johnston, who had received some reënforcements, sent a few brigades to oppose the advance; these were defeated at Raymond on the 12th, and driven back to Jackson, where Grant arrived on the 14th and burned the workshops, arsenal, and railway depot. Pemberton in the mean while had moved out with 18,000 or 20,000 men as far as Baker's creek or Champion hills, about half way between Vicksburg and Jackson, where Grant attacked him on the 16th, driving him back in confusion to the Big Black river, here crossed by a railroad bridge. There the attack was renewed with success on the morning of the 17th, and on the 18th the Union army crossed the Big Black on floating bridges, and began the formal investment of Vicksburg, just a year from the time when its surrender had been first demanded by Farragut's gunboats. Pemberton contracted his lines, abandoning Haines's bluff, and concentrating all his force in the works around Vicksburg. He had about 25,000 effective men, but was deficient in small ammunition, especially in gun caps, and had rations for only 60 days, with no prospect of more unless the investment could be broken. Johnston, whom illness had prevented from taking personal command there, wrote to Pemberton: "If Haines's bluff is untenable, Vicksburg is of no value and cannot be held; if, therefore, you are invested there, you must ultimately surrender. If it is not too late, evacuate Vicksburg and its dependencies, and march to the northeast;" and he himself moved in such a direction as to expedite a junction. Pemberton replied that it was impossible to withdraw the army, adding: "I have decided to hold Vicksburg as long as possible, with the firm hope that the government may yet be able to assist me in keeping this obstruction to the enemy's free navigation of the Mississippi river. I still conceive it to be the most important point in the confederacy." Hoping to carry the place by a *coup de main*, Grant attacked Pemberton's lines on May 19, but was repulsed, and began a regular siege. He was soon reënforced so as to have nearly 70,000 men, with whom he maintained the investment till the morning of July 3, when Pemberton sent him a note asserting that he was fully able to maintain his position for an indefinite period, but proposing that commissioners should be named on both sides to arrange terms of capitulation. Grant consented to meet Pemberton in person to arrange the terms. The meeting took place at 3 o'clock in the afternoon, and the actual surrender followed next morning. The paroled prisoners numbered about 27,000, of whom about three fifths were fit for duty in the trenches, the remainder being sick or wounded. The Union loss, from the crossing at Bruinsburg, April 30, to the surrender, was 943 killed, 7,095 wounded, and 537 missing; in all, 8,575, of whom 4,236 were before Vicksburg. The confederate loss is estimated at about 10,000.

VICO, Francesco de, an Italian astronomer, born in Macerata, May 19, 1805, died in London, Nov. 15, 1848. He was educated at the college of Urbino, and became in 1835 assistant superintendent, and in 1839 director of the observatory of the Roman college. In 1848, when the Jesuits were driven from Rome, he came to the United States. He died while in Europe for the purpose of purchasing instruments for an observatory to be erected under his direction in the state of New York. His fame as an astronomer rests on his observations of the ring system of Saturn and spots of Venus, and his discovery of seven or eight comets. He was also an excellent composer of church music.

VICO, Giovanni Battista, an Italian author, born in Naples about 1668, died Jan. 20, 1744. He was educated by the Jesuits and studied law, but never practised. For nine years he was tutor in jurisprudence to a nephew of the bishop of Ischia, and afterward for about 40 years professor of rhetoric at Naples. In 1735 he was appointed historiographer to the king. He wrote *De Ratione Studiorum* (1708), *De Antiquissima Italorum Sapientia* (1710), and *De uno Universi Juris Principio et Fine* (1720), all in a manner introductory to his main work, *Principii di una scienza nuova d'intorno alla commune natura delle nazioni* (1725), which is at once a history of civilization, a natural history of mankind, and a philosophy of law. Vico may be regarded as the founder of the philosophy of history. He places Divine Providence at the basis of all history, and shows its working in language, mythology, religion, law, and government. One of the best editions of his works is by Ferrari (7 vols., Madrid, 1834–'7).

VICQ D'AZYR, Félix, a French physician, born at Valogne, Normandy, April 28, 1748, died in Paris, June 20, 1794. In 1765 he went to Paris to complete his studies, and in 1773 he opened public courses of lectures on human and comparative physiology; but the jealousy of other professors finally obliged him to give private lectures. Daubenton, whose niece he had professionally attended and then married, enabled him to extend his sphere of activity. He was admitted to the academy of sciences in 1774, and Lassonne, the king's physician, employed him in official investigations of the murrain then raging in southern France, which ultimately led to the establishment of the royal medical society, of which he became perpetual secretary. In this capacity he delivered eulogies on Linnæus, Franklin, and others. In 1788 he succeeded Buffon in the French academy, the annals of which he enriched with numerous contributions. In 1789 he became first physician to Marie Antoinette. His devotion to her gave umbrage to the revolutionists, and they obliged him to attend Robespierre's festival of the Supreme Being (June 8, 1794), an ordeal which gave the final blow to his shattered health. His works include *La médecine des bêtes à corne* (2 vols., 1781); *Traité d'anatomie et de physiologie*, and *Système anatomique des quadrupèdes* (2 vols., 1786–'92); and *Système anatomique* (4 vols., 1791–1822). Moreau (de la Sarthe) delivered a eulogy on him in 1797, and Lemontey in 1827; Moreau edited a collection of his works (6 vols., 1805).

VICTOR (VICTOR-PERRIN), **Claude,** duke of Belluno, a French soldier, born at Lamarche, Lorraine, Dec. 7, 1764, died in Paris, March 1, 1841. He entered the army as a private in 1781, became a major in 1791, and was made brigadier general for his efficiency in the siege of Toulon, where he was twice wounded, but was not confirmed in that grade till 1795. In 1797 he was made general of division after brilliant services in Italy, where in 1800 he contributed largely to the victories of Montebello and Marengo. He was commander-in-chief of the Gallo-Batavian army in 1800–'2, was next appointed captain general of Louisiana, and in 1803 resumed the former office. In 1805 he went as minister to Copenhagen. In the following year he operated against the Prussians, into whose hands he fell while travelling in 1807, but was exchanged for Blücher. In the same year he was made marshal and duke after the battle of Friedland. In 1808 he was sent to Spain in command of the first corps, gained several victories and contributed chiefly to the capture of Madrid, shared in the defeat of Talavera, and in 1810 commenced the prolonged siege of Cadiz. In 1812 he served on the reserve in Russia, covering the retreat of the army across the Beresina. In 1813 he coöperated in the capture of Dresden and in the battles of Leipsic and Hanau. In March, 1814, he was severely wounded at Craonne. After the first restoration he adhered to the Bourbons, remained faithful during the hundred days, and was made a peer. Placed at the head of an investigating committee, he showed great severity toward those of his former comrades who had gone over to Napoleon. He was minister of war from 1821 to 1823, when he accompanied the duke of Angoulême as major general to Spain, but was recalled on account of frauds for which he was partly held responsible. He was appointed ambassador to Austria, but that government declined to recognize him as duke of Belluno, and he spent the rest of his life in retirement.

VICTOR AMADEUS II., duke of Savoy and afterward king of Sardinia, born May 14, 1666, died Oct. 31, 1732. In 1675 he succeeded his father Charles Emanuel II., under the regency of his mother, against whose wishes he married in 1684 a niece of Louis XIV., who regarded Savoy as a vassal state. At that monarch's request he persecuted the Waldenses, and sent auxiliary troops to the French army in Flanders; but as Louis insisted upon his control of the whole army of Victor Amadeus, he joined in 1690 the Augsburg league against France. This contest, in which he displayed great valor, was nearly fatal to him; but he obtained in a treaty with Louis XIV. (1696) the restoration of important territories occupied by the French, and a large indemnity in money, and joined the French army with his troops. His defection contributed to the termination of the war of the Augsburg league, through the treaty of Ryswick of 1697. After the outbreak of the war of the Spanish succession, as Louis XIV. refused to purchase his alliance by a cession of territory, he again turned against him, and, defeating the French, who had overrun Savoy and Piedmont, with the aid of Prince Eugene, he recovered all his possessions, and in 1713, by the treaty of Utrecht, received additionally a part of the duchy of Milan and the kingdom of Sicily, and on Dec. 24 was crowned at Palermo. In 1720 he exchanged Sicily for the island of Sardinia, which was then held by Austria, and assumed the title of king of Sardinia. On Sept. 3, 1730, he abdicated in favor of his son Charles Emanuel III. A short time before he had secretly married his mistress, the countess of San Sebastiano, whom he made marchioness of Spigno. At her instigation he made in 1731 repeated but futile attempts to regain his throne. He was imprisoned in September by order of his son, who was goaded on to this step by his courtiers and chiefly by the archbishop of Turin. He was dragged from his bed and confined for several days at the Rivoli palace, and then conveyed to Moncalieri, where he ended his life in captivity. His wife, who was permitted to join him, retired on his death to a convent in Turin, where she died in 1733.

VICTOR EMANUEL I., king of Sardinia, born in 1759, died at Moncalieri, near Turin, Jan. 10, 1824. He was the second son of Victor Amadeus III., and succeeded his brother Charles Emanuel IV., who abdicated in his favor in June, 1802. The French were then masters of the continental parts of his kingdom, and Victor Emanuel, after a residence of four years in Naples, in the vain hope of recovering his possessions, resided in the island of Sardinia under the protection of Great Britain till 1814, when he was reinstated on the throne. By the treaties of Vienna he ceded several districts to Geneva, and obtained the territory of Genoa. His extreme reactionary policy resulted in his overthrow by an insurrection in 1821, when he was obliged to abdicate, March 13, in favor of his brother Charles Felix.

VICTOR EMANUEL II. (VITTORIO EMMANUELE MARIA ALBERTO EUGENIO FERDINANDO TOMMASO), king of Italy, formerly king of Sardinia, born in Turin, March 14, 1820, died in Rome, Jan. 9, 1878. He was the eldest son of Charles Albert and Theresa, daughter of the grand duke Ferdinand of Tuscany. He received a careful education, and in 1842 married the archduchess Adelaide of Austria. When the war with Austria broke out in 1848, he took command of the brigade of Savoy, and followed his father to the field, participating in the battle of Goito, where he received a ball in the thigh. In his father's second war he won the admiration of the army by his valor at the disastrous battle of Novara, March 23, 1849. Immediately after this defeat Charles Albert abdicated in favor of his son, who thus came to the throne with a peace to make with a victorious enemy and a fierce conflict of faction to appease at home, while his alliance with an Austrian princess was regarded with distrust. The selection of his first cabinet under D'Azeglio tended to reassure the liberals. He soon effected a reorganization of the finances and of the army, signed a peace with Austria, and under the influence of Cavour, who till his death remained the principal adviser of the king, curtailed the privileges of the clergy, secularized the property of the church, and took from the religious associations the monopoly of education. Excommunicated by the pope on account of these measures, he issued a protest in the form of a *memorandum*. Within a brief period in 1855 he lost his mother, his wife, his brother, and his youngest child, and himself fell dangerously ill. By a treaty signed April 10, 1855, he joined the Anglo-French alliance in the Crimean war, and the position of Sardinia among the European states was greatly raised, mainly through the influence of Cavour. The marriage of his daughter Clotilda to Prince Napoleon (January, 1859) was followed almost immediately by the war of Italian independence, in which France and Sardinia took the field together against Austria. Victor Emanuel, invested with dictatorial powers, led his troops in person, accompanied by the heir apparent, Prince Humbert, to whom, though he was only 15 years old, he gave the command of a brigade. The king won the name of *rè gallantuomo* by his intrepidity at the battle of Palestro and by his valor on all occasions. After the battle of Magenta he entered Milan with Napoleon III., and on the field of Solferino found himself face to face with the Austrian general Benedek, whom he defeated after a severe fight. An interview at Villafranca between the French and Austrian emperors (July 11) settled the preliminaries of the treaty of peace, which was signed at Zürich (Nov. 10), and gave Lombardy to Victor Emanuel, excepting the fortresses of Mantua and Peschiera. In March, 1860, Savoy and Nice were ceded to France. In the course of the same year Victor Emanuel annexed Parma, Modena, and Tuscany, the rulers of which had been expelled by insurrections in 1859, a large part of the Papal States, and the Two Sicilies, the latter chiefly through the aid of Garibaldi; and on March 17, 1861, he assumed the title of king of Italy, bestowed on him by the Italian parliament on Feb. 26. In 1866, after a short war against Austria in alliance with Prussia, Venetia was incorporated in his dominions, and in 1870 the residue of the Papal States; and his capital, removed in 1865 from Turin to Florence, was transferred to Rome in 1871, where the king made his official entrance, July 2, taking up his residence at the Quirinal. For a fuller account of the events of his reign, the 25th anniversary of which was celebrated with great solemnity in March, 1874, see ITALY. The king's second daughter, Pia, is the present queen of Portugal; and his second son, Amadeus, was king of Spain from December, 1870, to February, 1873. (See AMADEUS I.) Victor Emanuel's morganatic wife was Rosa Vercellana, whom he made countess de Mirafiore.

VICTORIA, a British colony in S. E. Australia, between lat. 34° and 39° 9′ S., and lon. 141° and 150° E., bounded N. E. and N. by New South Wales, from which it is separated by the Murray river, W. by South Australia, and S. by the Pacific ocean and Bass strait, which separates it from Tasmania; area, 86,831 sq. m.; pop. in 1871, 729,868; estimated, Dec. 31, 1874, 808,407. The coast line is more than 600 m. long. The W. part as far as Cape Otway is generally low; its principal harbors are Portland bay, Port Fairy, and Warnambool or Lady bay. Between Cape Otway and Wilson's promontory the coast rises in some places 500 and 1,000 ft. above the sea. Here the chief harbors are Port Phillip bay, which is nearly 40 m. long and of about the same width, and Western Port. Wilson's promontory is a granite headland rising 3,000 ft. above the sea, connected with the mainland by a sandy isthmus. A peninsula extending N. from it forms Corner inlet, a bay well protected by sandy islands. Thence to Cape Howe, the most easterly point of Victoria, the coast is sandy, with many lagoons, the principal of which are Lakes Reeve, Wellington, Victoria, and King. The colony is divided into two unequal parts by a chain of mountains called the Dividing range, which runs E. and W., 60 or 70 m. from the coast. Its E. part, called the Australian Alps, varies from 1,000 to 7,000 ft. in height; its principal peaks are Mt. Hotham, Mt. Smyth, Mt. Selwyn, the Twins, Forest Hill, and the Cobboras. The part dividing the Wimmera district from Ripon county is called the Pyrenees; its principal peaks are the Coorong-ageering, the Jambour, and Ben Nevis. The W. end of the Dividing range forms the Grampians, the principal peak of which is Mt. William. There are many smaller ranges, several of which are spurs of the main range. Most of the rivers dry up in summer, but in winter are swollen into angry torrents. None but the Murray and the Yarra-Yarra are navigable. Besides these the principal rivers are the Goulburn, 230 m. long; Glenelg, 205 m.; Loddon, 150 m.; Wimmera, 135 m.; Avoca, 130 m.; Hopkins, 110 m.; Wannon, 105 m.; and Ovens, 100 m. There are many lakes, both salt and fresh, all of which are shallow, and some of them dry in summer. The largest is Lake Corangamite, 76 sq. m. Others are Tyrrell, Hindmarsh, Albacutya, Buloke, Connewarra, and Colac. Of the lagoons on the coast, Victoria covers 91 and Wellington 75 sq. m.—Geologically, Victoria is a mass of palæozoic rock, with large areas of granite and trap protruding through it. Its wealth in minerals is almost unparalleled, among its productions being gold, silver, copper, tin, zinc, iron, lead, antimony, cobalt, bismuth, manganese, molybdenum, coal, sulphur, kaolin, and bitumen; and of precious stones, the ruby, sapphire, topaz, garnet, and agate. It is estimated that one third of the area of the colony is occupied by gold-bearing rocks, only about one thirtieth of which has been properly explored.—The climate is mild, the mean temperature of summer being 66°, of winter 48°, and of the whole year 58°. In January and the early part of February, the hottest part of the summer, the thermometer frequently stands at 100° to 108°, and hot winds blow from the north; but they continue only 20 to 30 hours, and are succeeded by cool breezes from the south and southwest. In July, the coldest month, the thermometer rarely falls below the freezing point. The average rainfall is about 30 inches.—About three fourths of the soil of Victoria is available for agricultural and pastoral purposes. Along the coast the lands are light but fertile. Gipps Land, the S. E. part of the colony, is mostly rugged and mountainous, and remarkable for its minerals, but it contains large tracts suitable for grazing. The Murray district, in the east, is also mountainous and noted for mineral wealth, but it has vast plains of fine grass land, used as sheep runs, and some good agricultural land. The Wimmera district, occupying the whole of the northwest, consists chiefly of sandy, thinly grassed plains, with belts of myall scrub and forests of she-oak, box, and honeysuckle. The Loddon district is principally pastoral land, but contains some gold reefs in the S. part. The most useful of the native trees are the red and blue gums (eucalypti). The species called the peppermint attains a colossal height in the mountain ravines; a fallen tree near Healesville was 480 ft. long. Among the most numerous of the other indigenous trees are the *Banksia* or honeysuckle, she-oak, native cherry tree, and tea tree. Nearly everything grown in temperate climates thrives. Wheat, barley, and oats are the chief agricultural productions, but all the other grains and the legumes, roots, and grasses are largely raised. In 1875 there were 11,281,120 acres of enclosed land, of which 1,011,799 acres were under tillage; the total yield of wheat was 4,850,135 bushels, and of oats 2,121,612; wine produced, 599,093 gallons; and there were 180,254 horses, 11,221,036 sheep, 958,658 cattle, and 137,941 swine. For the indigenous animals, see AUSTRALIA.—Manufacturing industry has received a great impetus of late in consequence of being fostered by the government. In 1875 there were 1,545 manufactories, large and small, in the colony, the chief articles made being glass, paper, cloth, oil cloth, dyes, beer, starch, soap, cigars, pianos, safes, agricultural implements, engines, carriages, and brushes. There are 126 breweries, which in 1874 produced 13,653,531 gallons. The number of flouring mills was 161, most of which are worked by steam. Locomotives are now built at Ballarat; the first made in the colonies was delivered to the government on Feb. 6, 1873. But the most important industry of Victoria is gold mining, which in 1873 employed 52,544 men, of whom 13,528 were Chinese. The number of steam engines used in alluvial mining in 1874 was 353, of 9,317 horse power, and in quartz mining 788, of 15,549 horse power. The estimated value of all the machinery used in mining was £2,078,936; the number of quartz reefs worked or prospected was 3,398; and the number of companies registered was 143, with a nominal capital of £1,592,213. Many of the mining shafts are 500 to 1,000 ft. deep; in the Ararat district there is one nearly 1,500 ft. deep, and one has lately been sunk over 1,700 ft. The total amount of gold obtained from all the mines, from the discovery in 1851 to Jan. 1, 1875, was 44,414,177 oz., valued at £177,821,125. During 1874 the yield was 1,097,664 oz.; and during the first quarter of 1875, 257,641 oz. In the same year 18 mineral leases were issued for mining other metals than gold. The following shows the amount of other minerals produced in 1874: silver, 11,906 oz.; tin, 86,016 lbs.; iron ore, 130 tons; antimony ore, 111 tons; coal, 2,909 tons; and lignite, 750 tons.—The total value of the imports of Victoria in 1874 was £16,953,985; of the exports, £15,441,109. During the year ending March 31, 1875, there were exported 45,365,693 lbs. of greasy wool, 6,879,963 lbs. of scoured wool, and 36,416,355 lbs. of washed wool, all valued at £6,373,641. The number of vessels which entered the ports in 1873 was 2,187, of 756,103 aggregate tonnage, and 36,307 men.—The aboriginal population, which numbered about 5,000 when the colony was settled, had been reduced in 1871 to 1,330, of whom 784 were males and 546 females. The white population in 1871, of whom 401,050 were males and 330,478 females, were divided according to nationality as follows: natives of Australia and New Zealand, 356,936; England and Wales, 170,907; Scotland, 56,210; Ireland, 100,468; Germany, 9,264; United States, 2,423; France, 1,170; China, 17,857; other countries, 8,585; unknown, 3,514. There were 257,835 Anglicans, 170,952 Roman Catholics, 31,144 Presbyterians, 94,220 Wesleyans, 18,191 Congregationalists, and 47,513 of other Protestant sects. The number of churches and chapels in 1871 was 1,399, of which 229 were Anglican, 266 Presbyterian, 356 Wesleyan, 189 Roman Catholic, 91 Primitive Methodist, 61 Congregational, and 47 Baptist. Education is free, secular, and compulsory. In 1873 there were 1,936 schools and colleges, with 160,743 pupils and 4,257 teachers. Of these, 1,048 were common schools and 881 private schools. There were eight colleges and grammar schools, five of which are at Melbourne, two at Geelong, and one at Ballarat, and one university, at Melbourne, which had 134 students in 1872. Most of the large towns have public libraries; in 1875 there were 120 in all, with an aggregate of 162,540 volumes. In 1873 the public library in Melbourne had 75,500 volumes. Newspapers are published in all the large towns.—Victoria is divided into 38 counties. Besides the capital, Melbourne, the principal towns are Ballarat, Sandhurst, Geelong, Fitzroy (pop. 16,500), Castlemaine (7,500), Williamstown (7,200), Stawell (6,000), Daylesford (5,000), Warnambool (5,000), Hamilton (4,000), and Maryborough (3,500).—The government of Victoria consists of a governor appointed by the crown, whose term of office is seven years, an executive council, and a parliament of two houses, the legislative council and legislative assembly. The executive council consists of an attorney general, who is also premier, a treasurer, commissioners of trade and customs, of crown lands, of railways and roads, and of public works, a minister of mines and public instruction, a postmaster general, and a solicitor general. The legislative council consists of 30 members, representing six provinces into which the colony is divided, viz.: the central, northwestern, northeastern, southern, eastern, and western. The term of office is ten years, one member from each province retiring at the end of every two years. The qualification for members of this house is £2,500 freehold, or property of the value of £250 a year; for electors, a leasehold of £50 a year, or freehold property of the same value. In 1871 the number of electors in this class was 23,736. The legislative assembly contains 78 members, representing 49 electoral districts, who are elected for three years. Members receive £300 per annum. The qualifications for electors of this house are so small that universal suffrage may be said to prevail. In 1871 there were 142,305 voters in this class. All voting is by ballot. The net revenue of the government for the year ending June 30, 1875, was £4,132,118; the total expenditure, £4,325,277. The estimated revenue for 1875–'6 was £4,287,313; estimated expenditure, £4,488,658. The public debt on June 30, 1874, was £12,485,432, of which £10,657,000 had been expended on railway construction. The first railway in Victoria, from Melbourne to Sandridge, was opened in 1856. At the end of 1875 605 m. were in operation. The principal lines are: from Melbourne to Echuca, 156 m., with a branch from Castlemaine to Maryborough of 34 m.; Melbourne to Geelong, 45 m.; Geelong to Ballarat, 55¼ m.; Ballarat to Ararat, 57 m.; Ballarat to Dunolly, 56 m.; and Melbourne to Wodonga, 187 m. Lines are projected from Melbourne to Sale, 120 m.; Ararat to Hamilton, 64 m.; Sandhurst to Inglewood, 30 m.; Maryborough to Avoca, 15 m.; Leigh Road to Colac, 42 m.; and Portland to Hamilton, 55 m. In 1875 there were 3,928 m. of telegraph lines in operation, with 131 stations. There were 800 post offices and 210 money-order offices in the colony in 1873; income, £193,384; expenditure, £290,162. In 1875 the volunteer military force of the colony numbered 3,953 men, with 230 commissioned officers. The naval force comprised the cupola ship Cerberus of 2,100 tons and 4 guns, and the Nelson of 2,736 tons and 72 guns.—For the early history of Victoria, see Australia. The first settlement was made in 1835 on the W. shore of Port Phillip harbor, then included within the bounds of New South Wales. In 1839 was appointed the first superintendent of the district of Port Phillip, which had a population at that time of 3,511. An attempt was made in 1840–'41 to secure a separation from New South Wales, but independence was not achieved till 1851.

VICTORIA, a S. county of Texas, bounded E. in part by Garcitas creek, and S. W. by Coleto creek and Guadalupe river, the latter also intersecting it; area, 925 sq. m.; pop. in 1870, 4,860, of whom 1,768 were colored. The surface is low and level, and the soil fertile. The chief productions in 1870 were 71,078 bushels of Indian corn, 8,129 of sweet potatoes, 10,822 lbs. of butter, 14,871 of wool, and 205 bales of cotton. There were 5,047 horses, 2,044 milch cows, 62,303 other cattle, 5,445 sheep, and 4,069 swine. Capital, Victoria.

VICTORIA. I. A central county of Ontario, Canada, lying E. of Lake Simcoe; area, 1,305½ sq. m.; pop. in 1871, 30,200, of whom 14,157 were of Irish, 8,049 of English, 6,479 of Scotch, and 660 of French origin or descent. It is drained by Sturgeon lake and several streams, and is traversed by the Toronto and Nipissing and the Midland railways. Capital, Lindsay. **II.** A N. W. county of New Brunswick, Canada, bordering on Maine, and intersected by the St. John and Tobique rivers; area, about 1,900 sq. m.; pop. in 1871, 11,641, of whom 7,184 were of French, 1,696 of Irish, 1,509 of English, and 955 of Scotch origin or descent. Since the census Madawaska co. has been formed from the N. portion. The surface is rolling and varied, and remarkably fertile. Capital, Grand Falls. **III.** A county of Nova Scotia, Canada, comprising the E. portion of the N. projection of Cape Breton island; area, 1,198 sq. m.; pop. in 1871, 11,346, of whom 9,751 were of Scotch, 744 of English, and 665 of Irish origin or descent. The N. portion is mountainous and but scantily settled; the S. is better adapted to agriculture. Coal, iron, and salt abound, and gold and silver have been found. Capital, Baddeck.

VICTORIA, a city, port of entry, and the capital of British Columbia, on the strait of Fuca, at the S. E. extremity of Vancouver island, 65 m. S. S. W. of New Westminster, and 95 m. N. N. W. of Olympia, Washington territory; lat. 48° 27′ N., lon. 123° 25′ W.; pop. in 1870, 3,270. It has picturesque surroundings and a fine climate, except in winter, which is wet and stormy. On the N. border is a public park with a race course, surrounding an eminence called Beacon hill. Nearly all the stores and several of the churches are of brick and stone. The government buildings, of brick, occupy extensive grounds in the E. part of the city. Cary castle, the governor's residence, a large stone edifice costing $50,000, is in the suburbs. The city is lighted with gas and has water works. The inlet which forms the harbor runs N. for some miles with an average breadth of a few hundred yards. The entrance is narrow and tortuous, and does not admit vessels drawing more than 18 ft. Esquimalt, 3 m. distant, is used as a port by the largest vessels, and here are a British naval station and a naval hospital. There are fortnightly lines of steamers to New Westminster, Olympia, and San Francisco. The city contains four breweries, two distilleries, an iron foundery, a soap factory, two sash factories, two tanneries, a ship yard, two lumber yards, &c. There are two banks, a hospital, a theatre, two daily and two weekly newspapers, and Episcopal, Jewish, Presbyterian, Roman Catholic, and Wesleyan Methodist churches.—The Hudson Bay company established a fort and depot here about 1843, and in 1859, upon the organization of the colony of Vancouver Island, the place became its capital. In 1866 this colony was annexed to British Columbia, and Victoria became the capital of the united colony.

VICTORIA. See Hong Kong.

VICTORIA (Victoria Alexandrina), queen of Great Britain and Ireland and empress of India, born at Kensington palace, May 24, 1819. She is the sixth sovereign of the house of Hanover, and is the only child of Edward, duke of Kent, fourth son of George III., and the princess Victoria Mary Louisa of Saxe-Coburg-Saalfeld, relict of the hereditary prince of Leiningen. Her father died Jan. 23. 1820. Neither George IV. nor his brothers, the dukes of York and Clarence, had surviving legitimate issue, and she became heir presumptive to the throne on the accession of her uncle William IV. in 1830. Her education was intrusted to the duchess of Northumberland. On the death of William IV. without issue, June 20, 1837, the crowns of England and Hanover, which had been worn by the same person since the accession of George I. (1714), were separated, the former devolving upon the princess Victoria, and the latter, by virtue of the Salic law, falling to the duke of Cumberland, the late king's younger brother. Queen Victoria was crowned in Westminster abbey, June 28, 1838. When she came to the throne the whig ministry of Lord Melbourne was in power. Her sympathies were with that party, and they retained the administration, in spite of a majority against them in the commons, till 1841. The first years of the queen's reign were disturbed by the rebellion in Canada, the anti-corn-law league, the chartist agitation, the Jamaica question, Irish affairs, the Afghan war (1839–'42), and the war with China (1840). The revenue at the same time was steadily falling off, the deficit in 1841 being about £2,000,000. On Feb. 10, 1840, Queen Victoria was married to her cousin Prince Albert of Saxe-Coburg-Gotha. On Aug. 30, 1841, Lord Melbourne resigned, and was succeeded by Sir Robert Peel, who retained office till 1846. He succeeded in placing foreign affairs on a satisfactory footing, and carried through the introduction of an income tax and the abolition of the corn laws. The ministry of Lord John Russell (1846–'52) carried the empire safely through the Irish famine and the dangers of the year of revolutions (1848), and repealed the navigation laws (1849). The conservatives held office under Lord Derby through 1852, and were succeeded by the Aberdeen coalition ministry. Forced to give way before the pressure of public opinion on the question of the management of the Russian war, they were followed, in February, 1855, by the Palmerston ministry, who brought to a successful close the Russian war, as well as wars with Persia and China, and were struggling with the great Indian rebellion when, in February, 1858, they were defeated on a bill to punish conspiracies against foreign potentates, and resigned. Lord Derby held office till June, 1859, when Lord Palmerston was reinstated. The rebellion in India having been put down, the possessions of the East India company were transferred to the crown in August, 1858. The friendly relations which had long existed with Napoleon III. were maintained, and neutrality preserved during the Italian war, the civil war in the United States, the Polish insurrection, and the war in Schleswig-Holstein, though decided leanings on the part of the Palmerston ministry more than once threatened serious complications. The expedition against Mexico (1861) was soon abandoned, and the protectorate over the Ionian islands was given up (1863). Lord Palmerston died in October, 1865, when the ministry was remodelled under Earl Russell. It was defeated on a clause in the reform bill in June, 1866, and gave place to a conservative ministry formed by Lord Derby, which carried a reform bill through parliament in 1867. Lord Derby resigned in February, 1868, and Mr. Disraeli became prime minister. The Abyssinian expedition, begun under Derby, was successfully carried out. There being a majority against Disraeli in the elections of 1868, he resigned in December of that year. Mr. Gladstone was called to the premiership, and held office till the elections of 1874 showed the conservatives again in the majority. The leading events of his administration were the disestablishment of the Irish church, the Irish land act, the elementary education act, the abolition of purchase of army commissions, the negotiation of the treaty of Washington covering the Alabama claims, the passage of the ballot act, and the Ashantee war. He was succeeded in 1874 by Mr. Disraeli, who is still (1876) prime minister. One of his most striking acts of foreign policy was the purchase of the shares of the Suez canal stock belonging to the khedive of Egypt (November, 1875). From the day of her accession to the throne Queen Victoria has enjoyed to the fullest extent the respect and affection of her subjects; yet several attempts have been made to assassinate her: one in June, 1840, by a crazy lad named Oxford; another in May, 1842, by John Francis, who was sentenced to be hanged for the offence, but the sentence was commuted to transportation for life; and a third in July of the same year, by one J. W. Bean, whose only punishment was 18 months' imprisonment. Queen Victoria travels frequently both in her own dominions and abroad. Her mother, the duchess of Kent, died March 16, 1861, and the prince consort Dec. 14 the same year. Her grief at his death has been so intense as in a great degree to prevent her from appearing in public and at court ceremonials, though she has never neglected her duties as a sovereign. She lives in comparative seclusion, and generally spends the summer at Balmoral in Scotland. In February, 1876, she opened parliament in person for the first time since her bereavement; and in April she was authorized by an act of parliament proposed by Mr. Disraeli to assume the title of empress of India. The queen has had nine children, all of whom are living: Victoria, born in 1840, married in 1858 to the present crown prince of Prussia and of the German empire; Albert Edward, prince of Wales, 1841, married in 1863 to the princess Alexandra of Denmark; Alice, 1843, married in 1862 to Prince Louis of Hesse-Darmstadt; Alfred, 1844, created duke of Edinburgh in 1866, and married in 1874 to the grand duchess Maria, only daughter of the emperor Alexander II. of Russia; Helena, 1846, married in 1866 to Prince Christian of Schleswig-Holstein-Sonderburg-Augustenburg; Louise, 1848, married in 1871 to the marquis of Lorne; Arthur, 1850; Leopold, 1853; and Beatrice, 1857.—See "The Early Days of His Royal Highness the Prince Consort," compiled under the direction of the queen by Lieut. Gen. C. Grey (1867); "Leaves from the Journal of our Life in the Highlands" (1868), in which she was assisted by Sir Arthur Helps; and "Life of the Prince Consort" (1874), prepared under her direction by Theodore Martin.

VICTORIA FALLS. See ZAMBESI.

VICTORIA N'YANZA. See N'YANZA.

VICTORIA REGIA. See WATER LILY.

VICUÑA. See LLAMA.

VIDA, Marco Girolamo, an Italian poet, born in Cremona about 1485, died at Alba, Sept. 27, 1566. He studied at Padua and Bologna, and entered the order of the canons of St. Mark at Mantua. Subsequently he became canon of St. John Lateran in Rome, and prior of San Silvestro at Frascati, and in 1532 bishop of Alba. He was one of the most learned scholars and best Latin poets of his day. He wrote also in Italian. His best production is a metrical treatise *De Arte Poetica* (Rome, 1527), which, as well as his *Christias*, has been translated into English. His poem on chess, *Scacchiæ Ludus*, was translated by Goldsmith.

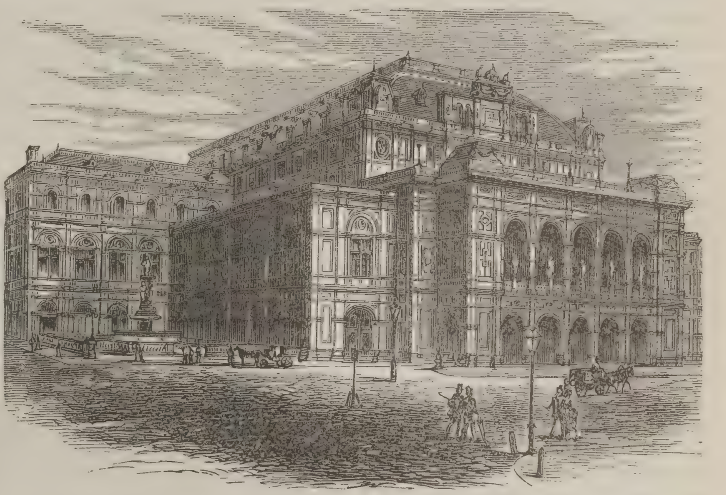
VIDIUS, Vidus, the Latinized name of GUIDO GUIDI, an Italian physician, born in Florence about 1500, died in Pisa, May 26, 1569. Early in life he was called to France, where he was appointed first physician to Francis I., and acquired great reputation both as a practitioner and as a lecturer. After the death of Francis I. he returned to Italy, where he became physician to Cosmo de' Medici, a member of the Florentine academy, and finally professor of medicine in the university of Pisa. His name is perpetuated in the anatomical designation of the Vidian nerve, a filament running from the spheno-palatine ganglion of the sympathetic at the base of the skull, backward through a special canal in the pterygoid bone, and connected by a double branch with the petrous portion of the facial nerve and the carotid plexus of the sympathetic. Vidius published many works on the institutes of medicine, hygiene, therapeutics, fevers, aliment, materia medica, and anatomy. They were all collected by his nephew of the same name, physician to the queen of France (3 vols., Venice, 1614).

VIDOCQ, Eugène François, a French detective, born in Arras, July 23, 1775, died in Paris, May 10, 1857. He began life as a baker, and early became the terror of his companions by his athletic frame and violent disposition. At the same time he was a notorious thief, and after many disgraceful adventures turned up as a soldier, and then as a spy. He was imprisoned at Arras at the instance of the terrorist Lebon, whose sister he married after his release. He accused her of faithlessness, enlisted in the army, and in 1796 returned to Paris with some money, which he soon squandered. Next he was sentenced at Lille to eight years' hard labor for forgery, but repeatedly escaped; and in 1808 he became connected with the Paris police as a private detective. His antecedents enabled him to render important services, and he was appointed chief of the *brigade de sûreté* (safety brigade), chiefly composed of reprieved convicts and others of similar character, which purged Paris of the many dangerous classes. In 1818 he received a full pardon, and his connection with this service lasted till about 1828, when he settled at St. Mandé as a paper manufacturer. Soon after the July revolution he became a political detective, but with little success. In 1836 he opened an office to aid in the recovery of stolen property, but it was closed by the police, and he narrowly escaped imprisonment. In 1848 he was again employed under the republican government, but he died penniless. Many works which he did not write appeared under his name, including *Les vrais mystères de Paris* (7 vols., Paris, 1844), and *Les chauffeurs du nord* (5 vols., 1845-'6); some authorities also deny his authorship of his *Mémoires* (4 vols., 1828; English translation, London, 1828). The best sketch of Vidocq is by M. B. Maurin (Paris, 1858).

VIEL-CASTEL. I. Horace de, count, a French author, born about 1797, died Oct. 1, 1864. He first published a *Collection de costumes, armes et meubles* (3 vols., Paris, 1826; 2d ed., 1834), and afterward many novels of fashionable life, including *Madame la duchesse* (1836), *Gérard de Stolberg* (1837), *Mlle. de Verdun* (1838), and *La noblesse de province* (4 vols., 1841-'2). He also produced several volumes relating to Marie Antoinette (1858-'9), and *Les travailleurs de* 1792, consisting of documents relating to the reign of terror (1862). **II. Louis de,** baron, a French historian, brother of the preceding, born Oct. 14, 1800. He was employed in the foreign office from 1818 to 1821; in the latter year he was attached to the legation at Madrid, and in 1828 to that at Vienna. In 1829 he became subdirector of the political department in the foreign ministry, retired in 1830, but held the office again from 1831 to 1848; and from 1849 till the *coup d'état* of Dec. 2, 1851, he was director. In 1853 he retired from public service and began to prepare his *Histoire de la restauration* (17 vols., 1860-'76; still in progress). His other works include *Essai historique sur les deux Pitt* (2 vols., 1846).

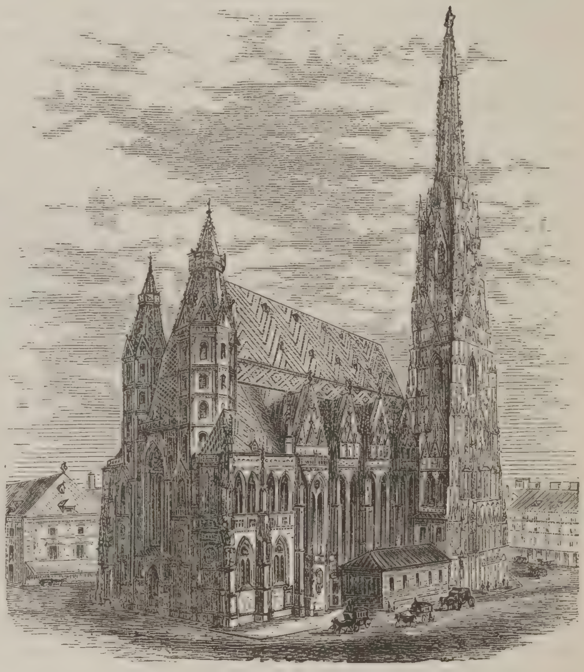
VIEN, Joseph Marie, a French painter, born in Montpellier, June 18, 1716, died in Paris, March 27, 1809. His "Plague of the Israelites in the Time of David" gained him the grand prize of the French academy in 1743, and a pension from the government, enabling him to spend six years at Rome. In 1754 he was elected to the French academy, and in 1775 became director of the French school of art at Rome, and in 1781 of the academy in Paris. Under Napoleon I. he was a senator. He was regarded as the first historical painter of his time, and the regenerator of painting in France. His veneration for the antique had a decided influence upon the works of his pupils David, Vincent, and others. Among his best paintings are "St. Denis preaching to the Gauls," "The Sleeping Hermit," "St. Louis intrusting the Regency to Blanche of Castile," "Hector inciting Paris to arm for the Defence of Troy," "The Parting of Hector and Andromache," "Briseïs in the Tent of Achilles," "Cupid and Psyche," "The Resurrection of Lazarus," and "The Virgin attended by Angels."

VIENNA (Ger. *Wien*), a city of Europe, capital of the Austro-Hungarian monarchy and of the province of Lower Austria, on the Danube, 330 m. S. S. E. of Berlin; lat. 48° 13′ N., lon. 16° 23′ E.; pop. in 1870, 834,284; in 1875, 1,020,770, of whom 673,865 were in Vienna proper and 346,905 in the *Vororte* or communes included in the police districts, but not in the municipal jurisdiction. There are about 25,000 Protestants, 45,000 Jews, and some members of the Greek and other churches; upward of nine tenths of the inhabitants are Roman Catholics. The city is situated in a fertile plain bordered by the Wienerwald, consisting of spurs of the Styrian Alps. About 5 m. N. W. of Vienna the Danube divides into two unequal branches, the southern and smaller of which, called the Donaukanal, after traversing the city, rejoins the main stream a few miles below. The Donaukanal receives the small river Wien and the Alser and Ottakringer creeks. The circuitous subdivisions of the northern arm have been led into a new channel, nearer to the city, about 4 m. long and 300 yards wide, which was opened to navigation on May 30, 1875. This partially obviates the dangers of inundation, from which the lower parts of the city have often suffered, and facilitates its extension in a northeasterly direction. The Donaustadt is here being laid out. Five bridges, two of them for railways, have been constructed across the new bed of the Danube. The finest of the 14 bridges over the Wien is the Elisabethbrücke.—Vienna is one of the most attractive capitals of Europe, and has been greatly embellished since 1858. Until then high walls and deep trenches surrounded the old "city" and divided it from the 36 so-called suburbs (*Vorstädte*). With the levelling of the fortifications the distinction between city and suburbs ceased, and Vienna was divided into nine districts, viz.: Innere Stadt, Leopoldstadt, Landstrasse, Wieden, Margarethen, Mariahilf, Neubau, Josephstadt, and Alsergrund. All but the second are on the right bank of the Danube. The Innere Stadt, still called "the city," comprises the oldest part of Vienna, the largest squares and most notable edifices, and the new and beautiful quarter which has risen on the site of the fortifications and the broad glacis which encircled them. The Ringstrasse, a series of boulevards lined with palatial buildings and planted with trees, forms a belt around this part of Vienna, 2⅔ m. long and 186 ft. wide. Parallel with it runs the Lastenstrasse, for the accommodation of the heavy traffic; and a third belt, the Gürtelstrasse, runs along the low ramparts thrown up in the beginning of the 18th century, marking the limits of the municipal territory. The area thus included has a circumference of 16 m., and contains about 11,000 houses. The *Vororte* gradually assume a rural character toward the surrounding hills and along the shores of the Danube. The streets of Vienna are well paved and kept in good condition, though in the old parts they are mostly narrow and irregular. The Ringstrasse and the almost equally fine streets crossing it constitute the favorite quarter of the wealthy. The new opera house, in this locality, is magnificent in its internal arrangements, and is one of the most beautiful theatres in Europe. The palaces of the archdukes Wilhelm and Ludwig Victor are imposing specimens of the renaissance style, and the gymnasium is a conspicuous Gothic building. Other prominent edifices on or near the Ringstrasse are the new academy of fine arts, the conservatory of music, the museum of arts and industry, the cen-



Opera House.

tral telegraph office, and the military headquarters. Among edifices in course of erection (1876) are a Gothic town hall, the new parliament and university buildings, the imperial museums, the imperial theatre, and the exchange. The fine Francis Joseph quay is the continuation of the Ringstrasse along the Donaukanal. Remnants of the old bastions have been preserved to support prominent structures, such as the palaces of the archduke Albrecht and the duke of Coburg, and the colossal Francis Joseph barracks. The wings of the last are connected by the Francis Joseph gate, one of the few remaining gates. The Jägerzeile in the Leopoldstadt, leading to the Prater, is a broad and animated thoroughfare, and there is at least one similar main street in each of the other districts, among the prominent structures of which are the Belvedere palace, built by Prince Eugene of Savoy, with a fine public garden, the great arsenal, and the station of the Northern railway, one of the finest in the world. The most important square is the Stephansplatz, with the cathedral and episcopal palace, constituting the centre of Vienna, the Kärntnerstrasse, the Graben, and other leading streets converging here. The large square called Am Hof, the Hoher Markt and Neuer Markt, and most other open spaces contain monuments and fountains. The Josephsplatz has an equestrian statue of Joseph II., and the Schwarzenbergplatz one of Field Marshal Schwarzenberg; and on the Schillerplatz the foundation of Schiller's monument was laid, May 9, 1875. On the outer Burgplatz (palace square), the largest in Vienna, are the equestrian statues of Prince Eugene and the archduke Charles. The Burgthor (palace gate), consisting of 12 Doric columns, is also here. The inner Burgplatz or Franzensplatz is formed by the four principal wings of the imperial palace. The easternmost, the Schweizerhof, dates from the 13th century; the northern, the most recent, was erected in 1728; the Amalienhof in the west dates from the 16th century; and the southern wing, containing the largest apartments, was completed in 1670. The monument of Francis I. stands in the middle of the Franzensplatz, and there are four groups representing the labors of Hercules at the portals of the northern wing. Adjoining the palace are the imperial theatre (*Burgtheater*), the riding school, considered the finest in Europe and the scene of splendid pageants, the imperial library, the museums of natural history, and the cabinet of coins and antiquities.—Vienna possesses about 60 Catholic churches and chapels, three Protestant and three Greek churches, and several synagogues. The cathedral of St. Stephen is one of the most magnificent specimens of Gothic architecture. The present edifice dates mainly from the 14th century. Its length is 354 ft., breadth 230 ft., height of nave 89 ft. The great southern tower, completed early in the 15th century, and renovated in 1860–'64, is about 470 ft. high. The cathedral contains nearly 40 marble altars; a pulpit by Anton Pilgram, rich in delicate carvings; and numerous monuments, of which that of the emperor Frederick III., with over 200 figures, is the most remarkable. Underneath the cathedral are vast catacombs. The church of Maria Stiegen, completed early in the 15th century, is another beautiful Gothic structure. The church of St. Peter is modelled after St. Peter's at Rome, and the church of St. Charles, completed in 1737, has an imposing cupola. The Augustinian church contains Canova's mausoleum of the archduchess Christine, and in the Capuchin church is the burial vault of the imperial family. The Votivkirche, begun in 1856 to commemorate the emperor's escape from assassination (1853), will be one of the finest of modern Gothic edifices. Among other notable places of worship are a Greek church and the new Jewish synagogue in the Moorish style. The Mekhitarist Armenian convent at Vienna is next in importance to the main establishment at Venice.—In the imperial palace is the chamber of treasures, in-



St. Stephen's Cathedral.

cluding the largest known emerald; the Florentine diamond of 133 carats, lost by Charles the Bold in one of his battles with the Swiss; the regalia used at the coronation of the German emperors, said to have been taken from the tomb of Charlemagne; Benvenuto Cellini's celebrated salt cellar; and many objects of historical interest. The cabinet of coins and antiquities contains over 140,000 coins and a large collection of cameos and intaglios, vases, bronzes, and gems. The imperial cabinets of zoölogy and botany and of mineralogy are almost unrivalled in completeness. An oriental museum was opened in 1875. In the armory of the arsenal is a curious collection of trophies of war. The miscellaneous Ambras collection in the Belvedere derives its name from a castle in Tyrol, whence it was transferred to Vienna. Connected with it is a museum of Egyptian antiquities. The Belvedere contains the imperial picture gallery, with over 2,000 paintings by almost all the great masters. The collections of Prince Liechtenstein, Count Harrach, and other noblemen, and the academy of fine arts, also abound in remarkable works. The imperial library, founded in 1440, has about 600,000 volumes, 20,000 manuscripts, and 300,000 engravings. The university library, founded in 1777, has 160,000 volumes; that of the archduke Albrecht contains a superb collection of engravings and drawings. The collection of manuscripts in the oriental academy is probably the richest in the world. Valuable libraries of from 10,000 to 80,000 volumes are attached to scientific institutions and convents, and to several private palaces. The university of Vienna, founded in 1365, enjoys a world-wide celebrity for the excellence of its medical school. In the summer term of 1875 the university had 3,919 students, of whom 32 were from the United States. The number of instructors in the winter term of 1875–'6 was 210. Astronomical and meteorological observatories, a botanic garden, and various museums and institutions are connected with the university. The Josephinum, an academy for the instruction of army surgeons, long famous for its anatomical preparations in wax, was recently closed. The polytechnic institute has extensive chemical, physical, and technological collections. In 1868 it was attended by 600 students, and in 1875 by 1,300. An agricultural college was founded in 1872. The academy of sciences, the geological institute, and the military geographical institute all occupy a high rank. The oriental academy prepares candidates for the diplomatic service in the East. The Theresianum, formerly accessible only to the aristocracy, now admits all classes. Among government institutions, the imperial printing office, a vast establishment, is in some respects unrivalled in its appliances. There are five gymnasiums, four *Realgymnasien*, eight *Realschulen*, more than 100 elementary public schools, and many special schools. The city devotes a capital of over 18,000,000 florins to charitable institutions, which are numerous and admirably managed. The general hospital accommodates 3,000 patients; in the connected lying-in hospital more than half of the illegitimate births (10,615 out of a total of 27,265 in 1874) take place, the surrounding country largely contributing to the number.—Vienna swarms with coffee houses, beer gardens, and other public resorts. The Prater, the principal promenade, is a fine park on an island in the Danube, over 5 m. long. It contains six principal avenues, one of which is chiefly frequented by fashionable people with elegant equipages; but the avenues leading to the so-called Wurstelprater, with panoramas, swings, bands of music, and rustic kitchens, are more animated, and their gay aspect is enhanced by the varied costumes of the Austrian nationalities, as well as of Servians, Greeks, and Turks. The great exhibition, opened in the Prater May 1, 1873, was visited by about 5,500,000 persons. The rotunda, the central portion of the main building, has been preserved. (See Industrial Exhibitions.) Among other open-air resorts are the Volksgarten, with Canova's group of "Theseus vanquishing the Centaur," in a temple designed after that of Theseus at Athens; the city park on the Ringstrasse, with the Schubert monument; and the botanic garden. There are eight theatres, besides the new opera house. The Burgtheater is the best in Germany; the Carltheater is patronized by all classes; while the most popular with the masses are the Josephstädter Theater and the Volkstheater in the Prater, in which last plays in the Viennese dialect are performed.—The elevation of the city near its centre is about 500 ft. above the sea. The climate is changeable and unhealthful; the average temperature of the year is 52°, of summer 70°, and of winter 32°. In spring and autumn the city is exposed to high winds, and pulmonary diseases prevail. The annual death rate is about 36 in 1,000. Vienna is supplied with excellent water from the Schneeberg, 40 m. distant, by an aqueduct completed in 1873, the most important modern work of the kind in continental Europe. The city is an emporium for the trade with the East. The principal articles of manufacture are fancy leather, mother-of-pearl and meerschaum articles, jewelry, kid gloves, clocks, musical and optical instruments, shawls, silks, and velvets. In the first half of 1875 the exports to the United States amounted to about 1,400,000 florins; they consisted chiefly of mother-of-pearl and horn buttons, leather, hides, furs, musical instruments, pipes, and kid gloves. The number of banks was reduced by the recent financial crisis from 69 in 1873 to 26 in 1875. Vienna is the centre of an important railway system. It communicates by steamboat with Linz and Pesth, but the shipping is inconsiderable. Horse railways cross the city in all directions. —The immediate surroundings offer charming scenery. The heights of the Leopoldsberg and Kahlenberg (see KAHLENBERG) command a view extending to the Styrian Alps on the south and the Carpathians on the east. The famous gardens of Schönbrunn, the summer residence of the emperor, about 3 m. S. W. of the city, are laid out in the formal style of the last century; they contain a menagerie and a botanic garden, with an extensive collection of tropical plants. The castle of Laxenburg, 9 m. S. of Vienna, possesses many curious relics of feudalism, and is surrounded by a fine park. Near by is the romantic Brühl valley, with the ruins of ancient strongholds. A few miles further S. is Baden, with celebrated sulphur springs, which were known to the Romans.—Vienna, originally probably a Celtic settlement, is first mentioned in history, under the name of Vindobona, as a station of the Roman legions in Upper Pannonia. It rose to strategic importance in the 2d century A. D., but was abandoned by the Romans after the incursion of the Huns in the 5th, and was successively occupied by the Longobards and Avars. It was the principal city of the Ostmark, founded by Charlemagne, and in 1160 became the residence of the dukes of Babenberg. The crusades contributed to its commercial development, and under the early Hapsburg rulers the city attained great prosperity. In the 15th century Æneas Sylvius, afterward Pope Pius II., testifies to the riches of Vienna and the fame of its university. The population was then 50,000. It was captured by Matthias Corvinus in 1485, and heroically defended against Sultan Solyman the Magnificent in 1529. Under Ferdinand I. it became the seat of the German emperors. In the 16th and 17th centuries it was strongly fortified, but its growth was impeded by religious disturbances during the thirty years' war, by the frightful ravages of the plague in 1679, and by the second invasion of the Turks in 1683, when the valor of Starhemberg and the timely succor of John Sobieski of Poland saved the city. It was greatly embellished under Leopold I., and endowed with institutions of learning by Maria Theresa and Joseph II. A treaty was concluded at Vienna in 1738 between Charles VI. and Louis XV. In 1805 and again in 1809 the city was occupied by the French; in the latter year the peace of Schönbrunn was negotiated, and in 1814–'15 the congress of Vienna was held. During the revolutionary movements of 1848 the city was the scene of serious disturbances, and after a rising in October was taken by Windischgrätz. (See AUSTRIA, vol. ii., p. 146.) On Oct. 30, 1864, peace was concluded at Vienna between Austria and Prussia on one side and Denmark on the other. The opening of the exhibition of 1873 coincided with a great financial crisis. It inflicted upon the government a loss of 14,866,921 florins, the expenditures amounting to 19,123,270 and the receipts to 4,256,349, according to official returns of March, 1876.—**The Congress of Vienna** was a conference of the European powers held after the first fall of Napoleon to carry out the stipulations of the treaty of Paris of May 30, 1814, and to reorganize the political system of the continent. Francis of Austria, Alexander I. of Russia, Frederick William III. of Prussia, and the kings of Denmark, Bavaria, and Würtemberg were present, besides minor princes, and all the European states were represented except Turkey. The foremost diplomatists present were Metternich for Austria, Nesselrode for Russia, Hardenberg for Prussia, Talleyrand for France, and Castlereagh for England. The preliminary discussions opened in September, 1814, and the general acts were signed on June 9, 1815, those relating to the Germanic confederation having been signed the day before. The main results were as follows: Austria was reinstated in her former possessions except the Spanish Netherlands, and kept Salzburg, Venetia (constituting with Lombardy the Lombardo-Venetian kingdom), and Dalmatia. Most of the duchy of Warsaw was erected into a hereditary kingdom for Alexander I. Prussia recovered Posen, and acquired half of Saxony, Swedish Pomerania, Westphalia, and important territories west of the Rhine. The republic of Cracow was created, and placed under the protection of Austria, Russia, and Prussia. Norway was confirmed to Sweden as a compensation for Finland, ceded to Russia in 1809. Holland, to which the Belgian provinces were united, was recognized as a kingdom under the prince of Orange, who for cessions in Germany received Luxemburg. Hanover was erected into a kingdom, and the two Mecklenburgs, Oldenburg, and Saxe-Weimar were constituted grand duchies. Germany, whose great mass of petty states and free cities had been mostly absorbed, was reconstituted into a confederation. Neufchâtel, under Prussian sovereignty, was admitted as a canton of the Swiss confederation, and the neutrality of Switzerland was guaranteed. The former ruling houses were reinstated in Naples, Sardinia, to which Genoa was annexed, Tuscany, and Modena, while Parma was assigned to the ex-empress Maria Louisa. The papal see recovered nearly the whole of its possessions, France retaining Avignon and Venaissin. The latter power was restricted to very nearly the same territory that it had possessed before the revolution. England retained Cape Colony and Mauritius, which had belonged respectively to Holland and France, as well as Malta and Heligoland, and relinquished her other conquests. The Ionian islands were declared an independent republic under British protection. The conclusion of the treaties, which had been delayed both by extravagant festivities and political intrigues, was hastened by the sudden return of Napoleon from Elba. The last coalition against him was immediately formed (March 25, 1815), and a few days after the signing of the treaties the battle of Waterloo was fought.

VIENNE, a W. department of France, formed chiefly from the old province of Poitou, bordering on the departments of Maine-et-Loire, Indre-et-Loire, Indre, Haute-Vienne, Charente, and Deux-Sèvres; area, 2,691 sq. m.; pop. in 1872, 320,598. It is level, excepting in the south. The principal rivers are the Vienne, Charente, Gartempe, and Creuse. About one third of the area is arable, one eighth covered with forests, and the remainder waste. The vine is extensively cultivated, but yields only inferior wines. Chestnuts form an important part of the food of the peasantry. Sand of a superior quality for making glass and imitation diamonds is procured from Vienne, and there are excellent quarries of lithographic stone and mill stones, and iron mines. Lace, woollen goods, iron ware, saddlery, firearms, and cutlery are made. It is divided into the arrondissements of Châtellerault, Civray, Loudun, Montmorillon, and Poitiers. Capital, Poitiers.

VIENNE (anc. *Vienna*), a town of Dauphiny, France, in the department of Isère, on the left bank of the Rhône, at the mouth of the Gère, 49 m. N. W. of Grenoble; pop. in 1872, 26,017. The cathedral of St. Maurice and St. Peter's are the most interesting churches. The college dates from 1605. The abbey of St. Peter is now a museum for the Roman antiquities which abound here, including remains of aqueducts and an amphitheatre, and a well preserved temple dedicated to Augustus and Livia.—Vienne was the capital of the first and second kingdoms of Burgundy. The 15th general council was held here in 1311–'12.

VIENNE, Haute. See HAUTE-VIENNE.

VIERSEN, a town of Rhenish Prussia, in the district of Düsseldorf, near the Niers and the Nordkanal, 10 m. S. W. of Crefeld; pop. in 1871, 18,550. It is an important centre of cotton, flax, woollen, silk, ribbon, and velvet manufactures, employing 10,000 persons.

VIETA, or **Viète, François,** a French mathematician, born at Fontenay-le-Comte in 1540, died in Paris in December, 1603. He was master of requests during the reigns of Henry III. and Henry IV. He was once saved from imprisonment and death by the duchess de Rohan. For Henry IV. he deciphered the communications made by the Spaniards with one another, through a cipher composed of more than 500 characters signifying different things at different times. He was the first to combine symbols of operation with symbols of quantity, and thus to render algebra a purely symbolical science. An edition of most of his works was published at Leyden in 1646, edited by Van Schooten.

VIEUSSENS, Raymond, a French physician, born in the district of Rouergue in 1641, died in Montpellier about 1720. His most important title to distinction rests upon his *Neurographia Universalis* (Lyons, 1685), on the anatomy of the brain, spinal cord, and nerves. Among other anatomical structures first described by him is the "valve of Vieussens," a thin layer of white nervous matter forming the roof of the anterior part of the fourth ventricle of the brain, and still known by his name. His last publication was his *Traité des liqueurs du corps humain* (Toulouse, 1715).

VIEUXTEMPS, Henri, a Belgian violinist, born in Verviers, Feb. 20, 1820. He is the son of a tuner of instruments, played the violin in public at the age of eight years, was a pupil of De Bériot for several months, studied composition under Reicha, appeared with success in Paris and Vienna in 1830, and spent several years in professional journeys through Europe, becoming a public favorite, especially at St. Petersburg and Moscow. In 1843, 1855, and 1870 he visited America, on the last occasion being associated with Mlle. Nilsson in concerts. His playing is distinguished by great energy and breadth, with remarkable elegance and correctness. His compositions combine the qualities of classical and modern music.

VIGILIUS, pope, born in Rome, died in Syracuse in 555. While yet a deacon he was designated by Pope Boniface II. (530–'32) as his successor in the papal see; but this act was repealed as uncanonical. During the pontificates of Agapetus I. and Sylverius, Vigilius was *apocrisiarius* or papal envoy at Constantinople. He sided with the imperial government against Pope Sylverius, and was sent to Rome to procure his imprisonment and exile. This being accomplished, Vigilius was proclaimed pope in 537, but is considered to have been an antipope till 540, when Sylverius died. Among many letters of doubtful authenticity is one said to have been written by Vigilius in 538, at the request of the empress Theodora, to the heads of the Monophysites, in which he approved of their views, and condemned the anti-Monophysite decisions of Pope Leo I.; but later (after 540) he refused to favor the Monophysites. For the course afterward adopted by this pope in the Monophysite controversy see CONSTANTINOPLE, COUNCILS OF.

VIGNOLA, Giacomo Barozzio da, an Italian architect, born at Vignola, in Modena, in 1507, died in Rome in 1573. He studied painting with the Passarotti at Bologna, but subsequently turned his attention to architecture, which he studied at Rome. After spending two years in France with Primaticcio, he went to Bologna, where he constructed several fine palaces and public buildings, and finally settled in Rome. He was appointed papal architect by Julius III. in 1550, and designed the church of the Jesuits in Rome, the Caparola palace, and the two lateral cupolas of St. Peter's, of which he became architect after the death of Michel Angelo. He also furnished the plans for the reconstruction of the palace of the Escurial in Spain. Vignola's works on "The Five Orders of Architecture" and "Practical Perspective" are still among the best authorities on those subjects.

VIGNY, Alfred Victor de, count, a French poet, born at Loches, Touraine, March 27, 1799, died in Paris, Sept. 18, 1863. He studied in Paris for a time, till his legitimist mother, fearing the ascendancy of Napoleon over her son's imagination, had him educated at her château by a private tutor. In 1816 he became a sub-lieutenant in the royal guard, and in 1823 a captain. In 1827, subsequent to his marriage at Paris with Lydia Bunbury, an English lady, he retired from service. He had been known since 1822 as a poet of superior genius, though his popularity with the romantic school and the masses of readers dated only from his historical romance *Cinq-Mars, ou une conjuration sous Louis XIII.* (2 vols., Paris, 1826), which had many editions and translations. He achieved a still more brilliant though not lasting success by his drama *Chatterton*, first performed in 1835 at the Théâtre Français. His relation with Mme. Dorval, the celebrated actress, who excelled as Kitty Bell in this play, and other irregularities of his life, caused great unhappiness to his wife. In 1845 he was elected to the academy. His earliest poetical works, *Héléna*, *La fille de Jephté*, *La femme adultère*, &c., were included in his *Poëmes* (1822). *Éloa, ou la sœur des anges*, *Le déluge*, *Moïse*, and *Dolorida*, included in his *Poëmes antiques et modernes* (1824–'6), are his finest and most original productions. In 1832 appeared his prose work *Stello*, and in 1835 *Servitude et grandeur militaire.* He also translated "Othello," and wrote *La maréchale d'Ancre*, a play entirely eclipsed by *Chatterton.* Ratisbonne edited his posthumous *Les destinées* (1864). A new edition of De Vigny's complete works appeared in 8 vols. (1863–'6).

VIGO, a W. county of Indiana, bordering on Illinois, and drained by the Wabash river; area, 400 sq. m.; pop. in 1870, 33,549. The surface is level or undulating and diversified with forests and prairies, and the soil is very fertile. Bituminous coal, limestone, and freestone abound. It is intersected by the Wabash and Erie canal, and by several railroads meeting at Terre Haute. The chief productions in 1870 were 354,132 bushels of wheat, 832,372 of Indian corn, 96,179 of oats, 144,319 of potatoes, 316,076 lbs. of butter, 56,637 of wool, and 13,950 tons of hay. There were 7,206 horses, 4,767 milch cows, 6,688 other cattle, 19,009 sheep, and 23,118 swine. The number of manufactories was 213; capital invested, $1,279,555; value of products, $4,102,154. The chief establishments were 5 for the manufacture of carriages and wagons, 2 of cars, 10 of bricks, 19 of cooperage, 2 of hubs and wagon material, 5 of iron, 4 of machinery, 2 of woollens, 10 flour mills, 1 distillery, 6 breweries, and 16 saw mills. Capital, Terre Haute.

VIGO, a seaport town of Spain, in the province and 15 m. S. of the city of Pontevedra, beautifully situated in a fertile region on the S. shore of the bay of Vigo; pop. about 8,000. It has old walls and suburbs, steep streets, extensive lazarettos, a harbor accessible to small craft, and a roadstead sheltered by hills and protected by fortified castles, where the English and French steamers to South America anchor. The annual imports, chiefly grain and oil, amount to about 20,000,000 reals, and the exports, including wine, fish, &c., to 7,000,000. The English, under Sir Francis Drake, repeatedly ravaged the place toward the close of the 16th century. On Oct. 23, 1702, the allied English and Dutch squadron destroyed the Spanish galleon fleet and French convoys off Vigo; and the English captured the town in 1719.

VILAYET, the designation of the chief administrative divisions or provinces of the Ottoman empire, each under the authority of a governor general (*vali*) and a council. The vilayets are divided into livas or sanjaks, under governors appointed by the Porte, but receiving their instructions through the governors general, and these into cazas or districts. Some of the Turkish provinces were until recently governed by pashas, and hence also called pashalics; but this name has been replaced by the term vilayet or its equivalent *eyalet* (government), which two terms are used more or less indiscriminately.

VILLAFRANCA, a town of Italy, in Venetia, on the Tartaro, 9 m. S. W. of Verona; pop. about 7,000. It has several churches and schools and the remains of a vast castellated structure. The chief branch of trade and industry is silk. Since the close of the last century the vicinity of Villafranca has repeatedly been the scene of battles. Charles Albert was defeated, July 25, 1848, by Radetzky, at the neighboring Custozza, and La Marmora on June 24, 1866, by the Austrians. But Villafranca is most memorable on account of the preliminary treaty concluded there July 11, 1859, personally between the emperors Napoleon III. and Francis Joseph, the main stipulation of which was the cession of Lombardy by the latter to Victor Emanuel of Sardinia. (See ITALY, vol. ix., p. 453.) This treaty was ratified by the definitive peace of Zürich, Nov. 10, 1859.

VILLANI, Giovanni, an Italian historian, born in Florence about 1280, died there in 1348. He was the son of a wealthy nobleman, and gathered in Rome and other places materials for his *Istorie fiorentine* (Venice and Florence, 1537–'54; edited by Baccio Valori, Florence, 1587; last ed., 7 vols., Milan, 1848). Villani was regarded as a master of pure Tuscan, and the Della Crusca academy considered his style, as presented in Valori's edition, an authority on the language. Villani is trustworthy only in regard to European and Florentine events which he witnessed himself. He brought the narrative down nearly to the time of his death; his brother Matteo continued it to the end of 1363, and Matteo's son Filippo to that of 1365. It was written in the interest of the Guelph party, to which Villani belonged, and he held various offices and also participated in Florentine wars and diplomatic negotiations. Massai's eulogy of Villani is appended to the edition of his works in 7 vols. (1802), comprised in the collection of Italian classics published at Milan.

VILLARS, Claude Louis Hector de, duke, a French soldier, born in Moulins, May 8, 1653, died in Turin, June 17, 1734. He was the son of the marquis Pierre de Villars, was a page at the court, where his fine bearing made him a favorite of Louis XIV., and became one of the most brilliant courtiers. He served from 1672 in many memorable campaigns, and was sent as ambassador to Vienna in 1686, and again in 1698. As commander on the Rhine in the war of the Spanish succession, he gained in 1702 a victory over the imperialists under Louis of Baden at Friedlingen, and the soldiers proclaimed him marshal on the battle field, in which rank he was confirmed by the king. In 1703 he was also successful at Höchstädt. In 1704 he operated against the Camisards in the Cévennes, and then checked the progress of Marlborough after his victory at Blenheim. In 1707 he defeated the imperialists near Strasburg, and in 1708 compelled the retreat of the duke of Savoy from French territory. In 1709 he succeeded Vendôme as commander of the army of Flanders. He was disabled by a wound at Malplaquet (Sept. 11), the bloodiest action of the war, in which the allied forces under Marlborough and Prince Eugene overwhelmed the French; but as they also suffered a heavy loss, Villars was rewarded by a peerage, and provided with apartments in the palace at Versailles, where the king himself watched over his recovery. This was barely effected when Villars rejoined the army; and in 1712 he achieved a great victory at Denain over the allies commanded by the earl of Albemarle, which greatly contributed to the peace of Utrecht in 1713. After continuing the war against Prince Eugene with great success, he took a prominent part in the treaty of Rastadt, March 6, 1714, which finally ended the Spanish war of succession. After the death of Louis XIV. in 1715 he opposed an alliance with England, and was one of the most judicious members of the council of regency. Under Louis XV. he received in 1733, in the war for the Polish succession, the rank of marshal general of the camps and armies of France, previously conferred only on Turenne, and ended his career with the conquest of the duchies of Milan and Mantua, retiring on account of his disagreement with the king of Sardinia, in whose capital he died soon afterward.—The abbé de la Pause de Margon prepared *Mémoires de Villars* (3 vols., Hague, 1734–'58), of which, according to Voltaire, only the first volume was based on a genuine autobiography. Louis Pierre Anquetil's *Mémoires* (4 vols., Paris, 1784) was published at the instance of the government, and comprises official military correspondence and the marshal's diaries. The memoirs in Petitot's collection (1828) and in Michaud's (1839) are based on the two preceding works.

VILLEGAS, Estéban Manuel de, a Spanish poet, born in Najera, Old Castile, in 1596, died there, Sept. 3, 1669. He was educated at Madrid and at Salamanca, where he studied law. When 21 years old he published a volume of poems, *Las eróticas* (4to, Najera, 1617), many of which he boasted of having written when only 14 years of age. The most remarkable of these are imitations of Anacreon, which are imbued with all the sweetness of their originals. He devoted the remainder of his life to the practice of law, and died unfortunate and poor. He wrote several dissertations on classic authors, and additions to the Theodosian code, and in 1665 translated Boëthius into excellent Spanish. His collected works were published in 1774 (2 vols. 8vo, Madrid).

VILLEIN. See SERF.

VILLÈLE, Jean Baptiste Séraphin Joseph de, count, a French statesman, born in Toulouse, Aug. 14, 1773, died there, March 13, 1854. He entered the navy, married in the island of Bourbon (Réunion), became a member of the colonial assembly, and in 1803 returned to France with a fortune. From 1815 he was for several years mayor of Toulouse and member for that city of the chamber of deputies, where he was a recognized leader of the ultra-royalists. In December, 1820, he was appointed minister without portfolio, and in December, 1821, minister of finance. On Sept. 7, 1822, he was made president of the council with the portfolio of foreign affairs, having previously received the title of count. Among the first important incidents of his administration was the military expedition to Spain in 1823 for the restoration of Ferdinand VII., which he had in vain resisted. After the accession of Charles X. (1824) he retained his influence at court, which became fatal to the monarchy, as his ultramontane and ultra-royalist policy paved the way for its final overthrow. In 1825 he succeeded, against much opposition, in securing an indemnity of 1,000,000,000 francs to the emigrants whose property had been confiscated during the revolution, and in reducing the interest on the public debt. He placed the public credit on a firmer basis, and from the Haytians he secured in 1825 an indemnity of 150,000,000 francs (later reduced to 90,000,000) as a condition for the recognition of their independence. But his creation of a new ecclesiastical ministry, the admission of bishops to the council of state, his partiality for the Jesuits, and his abortive attempts to restore the rights of primogeniture and to muzzle the press, subjected him to popular insults on the occasion of the king's review of the national guards, April 29, 1827. That corps as well as the chamber being thereupon dissolved, and the restriction of the press and other obnoxious measures being sanctioned by the new chamber, Villèle succumbed to the public exasperation in January, 1828, and was succeeded by Martignac. After the revolution of July, 1830, he retired to private life.

VILLEMAIN, Abel François, a French author, born in Paris, June 9, 1790, died there, May 8, 1870. He completed his education at the imperial lyceum (the present Louis-le-Grand college), where, as well as at the Charlemagne lyceum, he subsequently occupied the chair of rhetoric. He obtained academical prizes for his *Éloge de Montaigne* (1812), and for two other essays, including *Éloge de Montesquieu* (1816). In 1816 he became professor of rhetoric at the Sorbonne, having since 1814 taken Guizot's place as teacher of modern history. For several years he was chief of the printing and publishing department in the ministry of the interior; and in 1818 he was appointed auditor in the council of state. He was elected to the French academy in 1821; and in 1827 he lost the former offices for opposing the revival of the censorship. His lectures at the faculty aided in paving the way for the July revolution; and in 1830 he was elected to the chamber of deputies and strenuously opposed the fatal ordinances of Charles X. In 1832 Louis Philippe made him a peer. In 1834 he became president of the council of education, and succeeded Arnault as perpetual secretary of the academy. He was minister of education in 1839–'40, and again under Guizot from the autumn of 1840 till the end of 1844. Subsequently he took little part in politics, excepting in occasional speeches in the chamber of peers (1846–'7), and he altogether retired after the revolution of 1848. He refused allegiance to Napoleon III., and in 1852 he was removed from his chair at the Sorbonne, retaining only the title of honorary professor. In his younger days he had given a new impulse to literature and scholarship by the generous eclecticism of his criticisms, to historical studies by promoting the publication of *Documents inédits sur l'histoire de France*, and to general culture by educational reforms, and by a reorganization of the public library; and in the last 20 years of his life he developed a remarkable literary activity in revising his former and preparing new works. They include *Histoire de Cromwell* (2 vols., Paris, 1819); *La république de Cicéron*, a translation of Cicero's *De Republica*, from a palimpsest discovered in Rome in 1822 by Cardinal Mai (2 vols., 1823); *Discours et mélanges littéraires* (1823; enlarged, 1860); *Lascaris, ou les Grecs du quinzième siècle*, a historical novel (1825; new ed. by Gustave Masson, London, 1875); *Nouveaux mélanges historiques et littéraires* (1827); *Cours de littérature française* (5 vols., 1828–'38; enlarged, 6 vols., 1864); a celebrated *Préface du Dictionnaire de l'académie française* (1835); *Études de littérature ancienne et étrangère* (1846; enlarged, 1859); *Tableau de l'éloquence chrétienne au quatrième siècle* (1846; enlarged, 1857; later ed., 1861–'5); *Études d'histoire moderne*, comprising *Lascaris, Discours sur l'état de l'Europe au XV^e siècle, Essai historique sur les Grecs depuis la conquête mussulmane*, and *Vie du chancelier de l'Hôpital* (1846; enlarged, 1856; new ed., 1862); *Souvenirs contemporains d'histoire et de littérature* (2 vols., 1853–'5; new ed., 1859–'62); *Choix d'études sur la littérature contemporaine* (1857); *La tribune moderne*, the first part containing *M. de Chateaubriand, sa vie, ses écrits, son influence littéraire et politique sur son temps* (2 vols., 1858); and his elaborate *Histoire de Grégoire VII.*, preceded by his lecture on the history of the papacy down to the 11th century (2 vols., 1872).

VILLEMESSANT, Jean Hippolyte de, a French journalist, born in Rouen, April 22, 1812. He is a son of Col. Cartier and Mlle. de Villemessant, whose name he assumed. In 1830 he married and engaged in business at Blois. After residing at Tours and Nantes, he settled in 1840 in Paris, where he established the *Sylphide* and wrote the fashion articles for the *Presse.* In 1848 he was connected with several papers, which were speedily suppressed; but the *Chronique de Paris*, founded by him Jan. 1, 1850, was not molested till June, 1852. His two sons-in-law enabled him in 1854 to revive the *Figaro* as a weekly and semi-weekly journal, and Edmond About, Rochefort, and Henri de Pène wrote for it. The last was wounded in a duel, and Villemessant himself and his staff were repeatedly involved in duels. But he turned all these and subsequent difficulties to good account, and became so successful that in 1866 he was able to issue a daily and to pay Rochefort an annual salary of 30,000 francs. To save the paper from prosecution, the latter withdrew in 1868. The daily issue is now (1876) 70,000, chiefly on account of its entertaining gossip. Villemessant has conducted various other enterprises, and published *Mémoires d'un journaliste* (1867–'76 *et seq.*).

VILLERS, Charles François Dominique de, a French philosopher, born at Boulay, Lorraine, about 1765, died in Leipsic, Feb. 26, 1815. He was an artillery officer, but wrote against the revolution, and settled in 1797 in Lübeck. He devoted himself to the introduction of German literature and philosophy in France, translated a number of important works, and wrote *La philosophie de Kant, ou principes fondamentaux de la philosophie transcendentale* (1801), *Essai sur l'esprit et l'influence de la réformation de Luther* (1804), *Coup d'œil sur les universités de l'Allemagne protestante* (1808), and *Lettre à Madame la comtesse Fanny de Beauharnais sur Lubeck*, in which he related the atrocities committed by the French at the capture of that city, and which caused his arrest and exile in 1811, when the Hanseatic towns were incorporated in the French empire. He found an asylum in Göttingen, where he became professor, but at the restoration of the Hanoverian dynasty he was deposed.

VILLIERS. See BUCKINGHAM.

VILLOISON, Jean Baptiste Gaspard d'Ansse de, a French philologist, born at Corbeil-sur-Seine about 1750, died April 26, 1805. In 1773 he published from a manuscript Apollonius's lexicon of the Iliad and Odyssey, together with the fragments of Philemon (2 vols. fol., Paris). In 1778 he was sent by the government to Venice to search the library of St. Mark for unpublished Greek manuscripts, and in 1781 published his *Anecdota Græca* (2 vols. 4to, Venice). He also found there a manuscript Iliad of the 10th century with very ancient scholia (now known as the *scholia Veneta*), which he printed in 1788. Explorations in the library of Weimar led to the *Epistolæ Vimarienses* (4to, Zürich, 1783). He subsequently travelled several years in Greece and the Archipelago, and became a member of the institute.

VINAGO. See PIGEON.

VINCENNES, a city and the capital of Knox co., Indiana, on the E. bank of the Wabash river, here navigable by steamboats, about 90 m. above its mouth, and 100 m. S. W. of Indianapolis; pop. in 1850, 2,070; in 1860, 3,960; in 1870, 5,440; in 1875, locally estimated at 8,500. It is in the midst of a fertile country abounding in coal, and has good manufacturing facilities. By rail it is connected with St. Louis, Cincinnati, Indianapolis, and other points. The lines meeting here are the Ohio and Mississippi, Evansville and Crawfordsville, Indianapolis and Vincennes, and Cairo and Vincennes. The chief manufactories are five flouring mills, two woollen factories, an iron foundery, a starch and sirup factory, a planing mill, a hub and spoke factory, and the machine shops of the Ohio and Mississippi railroad. Two national banks have a joint capital of $350,000. There are a high school and several other public schools, with about 1,300 pupils. The Roman Catholics have several schools and two orphan asylums. Vincennes university, chartered in 1807, is conducted as a high school. There are four libraries. A semi-weekly and three weekly newspapers are published. There are 10 churches, viz.: Baptist, Christian, Episcopal, German Evangelical, Jewish, Lutheran, Methodist, Presbyterian, and Roman Catholic (2).—Vincennes is the oldest town in the state. In 1702 the French established a mission here, and a few years later a fort was built. It came into the possession of the British with the surrender of Canada, and was taken from them by Gen. Clark, Feb. 26, 1779. It became the capital of the territory of Indiana upon its organization in 1800, and so remained till the seat of government was removed to Corydon in 1814. It was incorporated as a borough Sept. 6, 1814, and as a city Feb. 13, 1856.

VINCENNES, a town of France, in the department of Seine, 1 m. E. of Paris, on the railway to Lyons; pop. in 1872, 17,064. The old castle was the nucleus of the present fortifications, which are a part of those of Paris. It contains the principal arsenal of Paris, a large armory, extensive barracks, schools in which the best marksmen (*chasseurs de Vincennes*) are trained, a chapel, and a dungeon consisting of a square stone tower 170 ft. high, with walls 10 ft. thick. The castle, being surrounded by many of the other detached works, was of strategic importance during the siege of Paris in 1870-'71. It had its origin in a hunting box built by Louis VII. in the 12th century. Philip of Valois substituted for this a royal palace, subsequently enlarged and embellished by Louis XIV. Under Louis Philippe it was surrounded with a complete system of modern fortifications, and the former nine lofty towers were converted into bastions. The castle is associated with many great personages who resided or died here, and with celebrated prisoners of state incarcerated in the dungeon. The duke d'Enghien was shot here, March 21, 1804. Various improvements, including the new military hospital and small chapel, originated with Napoleon III. The park of Vincennes has been much enlarged since 1854, when it was placed under the care of the Paris municipality, and extends over more than 3 m. The centre forms a continuous open space for the race course, and for artillery practice and other military exercises. Outside this space are extensive walks and drives which intersect the pleasure grounds. The principal artificial lake (*des Minimes*) has three wooded islands; Lake Charenton dates from 1866. A model farm was erected by Napoleon III. S. of the woods, near the Marne, and he also founded an asylum for convalescent workmen, with fine grounds. The park of Vincennes is for the east end of Paris what the Bois de Boulogne is for the west end.

VINCENNES, Jean Baptiste Bissot, sieur de, an American soldier, born in Quebec in January, 1688, burned by the Chickasaws in 1736. He was the tenth child of François Bissot, and brother-in-law of Joliet, the explorer of the Mississippi. He was an active officer in the west, and in 1704 attacked an Ottawa party and rescued some Iroquois prisoners taken in violation of treaties, thus averting a war. He was engaged in 1712 in the operations against the Foxes at Detroit, and soon after founded the post that still bears his name. He took part in 1736 in an expedition from the Illinois country against the Chickasaws, while another attacked them from Louisiana. The latter expedition failed, and D'Artagnette and Vincennes, pushing on, carried some towns, but were finally defeated, and nearly all killed or taken. Vincennes, with D'Artagnette, Father Senat, and some others, was burned.

VINCENT, William, an English classical scholar, born in London, Nov. 2, 1739, died there, Dec. 21, 1815. He was educated at Westminster school and at Cambridge, became an usher in the former in 1762, and was head master from 1788 to 1802, when he was made dean of Westminster in reward for his "Defence of Public Education, in a Letter to the Lord Bishop of Meath" (8vo, 1802). His chief work is "The History of the Commerce and Navigation of the Ancients in the Indian Ocean" (2 vols. 4to, 1807), comprising "The Voyage of Nearchus to the Euphrates, collected from the Original

Journal preserved by Arrian," first published in 1797, and "The Periplus of the Erythræan Sea," in 1800 and 1805.

VINCENT DE PAUL. See PAUL, VINCENT DE.

VINCI, Leonardo da, an Italian painter, born at the Vinci palace, near Florence, in 1452, died at the château of Clou, near Amboise, France, May 2, 1519. He was an illegitimate son of Pietro da Vinci, and from his youth was remarkable for his handsome and noble presence, and for his wonderful aptitude in almost all branches of art and science. He speedily excelled his teacher, Andrea Verocchio. At first he delighted most in fantastic and monstrous pictures. Ludovico Sforza (il Moro) of Milan paid 300 ducats for his Medusa head, and about 1483 attached him to his court as musician and improvisatore. He displayed great activity in sculpture, architecture, and other arts, but chiefly in painting. He founded an academy of art, and opened a new era remarkable for superior dramatic composition and for improved local coloring and chiaroscuro. He executed an admirable colossal model for an equestrian statue of Francesco Sforza, and many portraits, perfected his knowledge of anatomy under Marc' Antonio della Torre, and about 1496 began his fresco of the "Last Supper" for the Milanese convent of Santa Maria delle Grazie, which has been called the highest effort of Christian art. The original has been much damaged; the best copy, by Leonardo's pupil Oggione, is in the royal academy, London; there are several other copies and engravings of it, the most celebrated of the latter by Morghen. In 1499, when his patron was ousted by the French, he removed from Milan to Florence, and subsequently was for some time employed in exploring Tuscany as an engineer and architect. The most celebrated works which he executed during his stay in Florence are the cartoon of Santa Anna, the "Adoration of the Kings," and several portraits, now in the Louvre, the best known through copies and engravings being the *Madonna Lisa del Giocondo*, or *La Joconde*, for which Francis I. is said to have paid 4,000 gold crowns, and *Ginevra di Amerigo Benzi*, called *La belle Ferronnière.* His father dying in 1504, he left Florence, and after spending some time in various cities, chiefly in Milan, where he designed the canal of Martesana, a marvel of skill, he accompanied Giuliano de' Medici to Rome to witness the coronation of the latter's brother as Pope Leo X. (March 19, 1513). He soon joined Francis I. at Milan, and as court painter accompanied him to France, where he ended his life in the company of his friend Melzi. In 1874 his remains were deposited in the chapel of the palace of Amboise, with an inscription, by the count de Paris, the present owner of it.—Many pictures attributed to Da Vinci were painted by his pupils, especially by Luini and Oggione. His almost universal genius was the marvel of the age. Hallam concedes to him the foremost rank among the illustrious men of the 15th century, and regards his anticipations of the great discoveries in astronomy, geology, and other sciences as almost preternatural. He was almost entitled to the claim of inventing the art of chiaroscuro. He wrote *Trattato della pittura* (Paris, 1651; best later ed. by Manzi, 2 vols., Rome, 1817; best English translation by John Francis Rigaud, London, 1802; new ed., 1835), which Mrs. Jameson says is the basis of all subsequent works on the theory and practice of art. He bequeathed most of his manuscripts on the arts and sciences to Melzi; many of them and of his printed works are in the Ambrosian library in Milan, and a large portion is now in Paris. His manuscripts were made known by Ventura in his *Essai sur les ouvrages physico-mathématiques de Léonard de Vinci* (Paris, 1797), and by Libri in his *Histoire des sciences mathématiques en Italie* (1838–'41; 2d ed., 1865). Among his biographers are Amoretti (Milan, 1784), Dom Pino (1796), G. Bossi (Padua, 1814), and John William Brown, with an engraving of the "Last Supper," and chiefly compiled from manuscripts and printed works in the Ambrosian library (London, 1828; new ed., 1835, appended to the translation of the "Treatise on Painting"). See also *Léonard de Vinci et son école*, by F. Rio (Paris, 1855), and "Leonardo da Vinci and his Works" (London, 1873), containing a critical catalogue of his most important paintings, by Mrs. Charles W. Heaton, and an essay by C. C. Black on "Leonardo da Vinci in Science and Literature," largely based on Gilberto Govi's *Il genio di Leonardo.*

VINDELICIA, a province of the Roman empire, bounded N. by the Danube, which separated it from Germany; E. by the Œnus (now Inn), which separated it from Noricum; S. by Rhætia, of which it originally formed a part; and W. by the territory of the Helvetii. It comprised parts of the modern countries of Baden, Würtemberg, Bavaria, Tyrol, and Switzerland. The Vindelici, a Celtic people, formed the principal part of the inhabitants. Vindelicia was conquered by Tiberius in the reign of Augustus.

VINDHYA MOUNTAINS, a range extending across the peninsula of India, and connecting through the Satpoora mountains with the N. extremity of the Western Ghauts. They extend from the vicinity of the W. coast, about lat. 22° N., in an E. N. E. direction to the valley of the Ganges in about lat. 25° N., and form the N. boundary of the valley of the Nerbudda, which flows close to their base. The name Vindhya is commonly applied only to the western portion of the chain, its continuations down the Sone valley toward the Ganges being chiefly known as the Kaimur mountains. The maximum altitude is about 2,500 ft. The geological formation is granite and sandstone underlying trap rock.

VINDOBONA. See VIENNA.

VINE. See GRAPE.

VINEGAR, diluted impure acetic acid, in the form in which it is usually produced by the acetification of the fermented juices of fruits and other vegetable substances. The acetification of alcohol may be effected by the action of spongy platinum, by which the alcohol is dehydrated and at the same time oxidized, aldehyde being supposed to be an intermediate product. (See FERMENTATION, vol. vii., p. 143.) The theory of acetous fermentation is not established beyond question. Liebig regarded it as a species of eremacausis or slow oxidation; but Pasteur and others maintain that it is produced by the development of a minute fungus (see VINEGAR PLANT), and the latter view is the one now most generally adopted.—The manufacture of vinegar is conducted according to different processes in different countries. In Great Britain it is manufactured on a large scale by the fermentation of malt, while on the continent it is usually made from soured wines, and also, as well as in England, from soured beer and ale. The production from malt in England is by the German rapid process, in which the fermented wort is made to fall in a shower upon birch twigs or shavings, the great exposure to the air facilitating the oxidation of the alcohol. The liquor which is drawn off at the bottom of the cask is repeatedly turned in at the top until the acetification is completed. This method has the advantage of rendering insoluble glutinous and albuminous principles, which if retained are liable to produce putrefaction.—Wine vinegar is made on a large scale at Orleans in France. Wines which are unfit for drinking are sent here from all parts of the country. In a vinegar manufactory a great number of casks are set on end in a large room, where the temperature is maintained at about 86° F. The upper head of each cask is perforated with several holes about two inches in diameter for the circulation of air, and is placed at a more than usual distance below the edge, so that the wine may be turned in. A few gallons of boiling vinegar are first turned into the cask, and in a week or eight days about one tenth as much sour wine is added, and this process is repeated every seven or eight days till the cask is full. In a fortnight or three weeks the vinegar is ready for the market. In France and also in other countries vinegar is made by mixing wine lees with sour wine in perforated casks, sometimes placing the mixture in coarse sacks, drawing off the liquor, and subjecting it to further acetification in other casks perforated at the top; these are exposed to the heat of the sun in summer and to that of the stove in winter.—Wine vinegar is of two kinds, white or red, according as it is prepared from white or red wine; it contains, besides acetic acid and water, some ethyle acetate, and, according to Magnes Lahens, always a little aldehyde. It also contains some salts, principally bitartrate of potash. Its specific gravity varies from 1·014 to 1·022. The malt vinegar made in Great Britain is of four different strengths, distinguished as Nos. 18, 20, 22, and 24. The last is the strongest, containing 5 per cent. of real acetic acid; its specific gravity is 1·019, and it is called proof vinegar. Vinegar is liable to putrefactive fermentation, which was believed by the makers to be prevented by the addition of sulphuric acid, of which they are allowed by law in England to add $\frac{1}{1000}$ part by weight. It is now known that this is unnecessary, but the practice is continued.—In the United States vinegar is usually made from cider, and when this is made from sweet apples and is of good strength the vinegar is often preferred to all other kinds. The cider is exposed in barrels with their bung holes open to the action of the sun in summer, or it is kept in a warm cellar. Cider vinegar usually contains, besides ethyle acetate and other ethers, more or less malic acid.—When vinegar is subjected to distillation it is deprived of its coloring and other non-volatile matters, and is known in commerce as distilled vinegar, which is always weaker than the vinegar from which it is obtained, because the boiling point of strong acetic acid is higher than that of water. Vinegar is liable to be adulterated with sulphuric and sulphurous acids, and to contain more or less of metallic acetates derived from the vessels in which it is kept. Chloride of calcium will show the presence of free sulphuric acid when boiled with vinegar, without causing the least precipitate with the minute portions of sulphates usually present.

VINEGAR PLANT. Many households are supplied with vinegar by preparing a weak solution of sugar or of molasses, and placing in this a fragment of a gelatinous substance known as vinegar plant. If left at a proper temperature (about 70°) for some days, the sugar will be found to have disappeared, and the liquid become a weak vinegar. The fragment of vinegar plant increases rapidly in size, and if the quantity of sugary liquid present be sufficient, it will be found to cover the surface completely, conforming itself to the shape of the vessel, and often half an inch thick or more. This floating mass has much the color and texture of a piece of glue that has been soaked in cold water previous to dissolving it, and may be separated into thin transverse layers; examined under a microscope, it is seen to consist of innumerable delicate branching threads, which interlace and form the mass. Under favorable circumstances, the surface is soon covered with the blue (sometimes yellow or green) mould (*penicillium glaucum*) so common on bread and other vegetable substances, showing that the vinegar plant is the mycelium or vegetative portion of a fungus of which the colored mould is the reproductive portion. The *penicillium* does not of necessity produce its mycelium always in liquids, as wherever the mould is seen the mycelium will be found; but in favorable liquids and at a proper temperature the plant will increase its mycelium very rapidly and to an indefinite extent, without, under these conditions, any attempts to reproduce itself by spores. The "mother" of vinegar found in old vinegar barrels is a form of this mycelium, and it is now considered that the yeast plant, formerly regarded as an alga, is a form of the same, with differently shaped and detached cells. (See FERMENTATION, and FUNGI.) Mycelia appear in various saline solutions and favor their decomposition, as in some pharmaceutical preparations; in the solutions of sulphate of copper in electrotyping establishments one appears often to an annoying extent; most, if not all, of these are supposed to be modified forms of the mycelium more highly developed in the vinegar plant.

VINEIS, Petrus de, or **Pietro delle Vigne,** an Italian jurist, born in Capua, committed suicide in Pisa in 1249. He was educated at Bologna, and became known by accident to the emperor Frederick II., who raised him from one office to another, and at last made him his chancellor. In this capacity he defended his master both in writing and orally against Popes Gregory IX. and Innocent IV. He was probably present in 1245 at the council of Lyons, before which Frederick was cited, but seems to have been silent; and it was surmised that he had betrayed the emperor's interests. The popular story of his time was that he was accused of attempting to poison his master, and was led on an ass through the streets of Pisa and cast into prison, where he dashed his brains out against the wall. His extant writings are *De Potestate Imperiali*, and six books of letters on the acts of Frederick II., in bad Latin, but of much historical importance. Besides these, a sonnet and two *canzone* by him are among the earliest specimens of Italian literature.

VINELAND, a post village of Cumberland co., New Jersey, on the West Jersey and New Jersey Southern railroads, 34 m. S. of Philadelphia and 115 m. S. S. W. of New York; pop. in 1875, about 2,300. It is regularly laid out on a plot a mile square. The principal avenues are 100 ft. wide, the others 60 ft., and all are bordered with double rows of shade trees. The dwellings are handsome, and are surrounded by flower gardens, vineyards, and orchards. Many of the stores are of brick. The bank building and the new hotel are fine structures. There are several commodious public halls, the largest accommodating 1,000 persons. The making of shoes, the chief branch of manufacture, employs eight establishments. There are five schools, two daily and four weekly newspapers, two monthly periodicals, and eight churches. The village is situated in a tract of 48 sq. m. purchased by Charles K. Landis in 1861, when it contained about 25 inhabitants. The whole tract is laid out similarly to the village, and is divided into fruit farms of from 5 to 25 acres each. It lies chiefly in the township of Landis, Cumberland co., but extends into Buena Vista, Atlantic co., and Franklin, Gloucester co. Besides Vineland it contains four post villages, viz.: Forest Grove, Landisville, North Vineland, and South Vineland. The population in 1870 was 7,079, and in 1875 about 10,500. There are 18 school houses, with about 1,000 pupils, and 12 churches. The climate is mild and healthful. Poultry raising is extensively carried on, and considerable wine is made, but fruit raising is the chief business. Large quantities of strawberries, raspberries, blackberries, peaches, pears, and grapes are sold. The sale of intoxicating liquors is prohibited by vote of the people.

VINER, Charles, an English lawyer, born about 1680, died in 1756. He compiled "A General and Complete Abridgment of Law and Equity" (24 vols. fol., 1741–'51), the preparation of which occupied, according to Blackstone, half a century. It was reprinted in 24 vols. in 1792–'4, and followed by a supplement (6 vols., 1799–1806). He bequeathed £12,000 to establish a professorship of common law at Oxford, of which Blackstone was the first incumbent, and to endow fellowships and scholarships.

VINET, Alexandre Rodolphe, a Swiss author, born near Lausanne, June 17, 1797, died near Vevay in May, 1847. He studied at the academy of Lausanne, and taught French literature at the university of Basel from 1817 to 1837, when he became professor at Lausanne, teaching practical theology till 1845, and subsequently French literature. He had entered the Protestant ministry in 1819, and in 1823 Guizot procured a prize from the society of Christian morals for his essay *Sur la liberté des cultes.* He became one of a commission for organizing the Protestant church in the canton of Vaud; but his views of the respective functions of the government and of the church not being adopted, he seceded from the state church and aided in forming an independent organization; and he finally (Dec. 2, 1846) lost his professorship on account of his opposition to the new radical authorities of the canton. His works, the most important of which have been translated into English, include *Essai sur la manifestation des convictions religieuses, et sur la séparation de l'Église et de l'État* (Paris, 1842; 2d revised ed., 1858); *Études sur Blaise Pascal* (1848; 2d ed., 1856); *Méditations évangéliques* (1849); *Études sur la littérature française au XIX^e^ siècle* (3 vols., 1849–'51; 2d ed., 1857); *Théologie pastorale, ou théologie du ministère évangélique* (1850; 2d ed., 1854); *Histoire de la littérature au XVIII^e^ siècle* (2 vols., 1851); and *Homilétique, ou théorie de la prédication* (1853). J. F. Astié has published, under the title of *Esprit d'Alexandre Vinet*, a synopsis of *Pensées et réflexions*, extracted from all his works (2 vols., Geneva, 1861).—See *A. Vinet, sa vie et ses œuvres*, by Edmond Schérer (Paris, 1853); *A. Vinet, histoire de sa vie et de ses ouvrages*, by E. Rambert (Lausanne and Paris, 1875); and Sainte-Beuve's *Portraits contemporains*, vol. ii.

VINLAND. See NORTHMEN.

VINTON, a S. county of Ohio, drained by Salt and Raccoon creeks; area, 414 sq. m.;

pop. in 1870, 15,027. The surface is undulating and the soil very fertile. Bituminous coal and iron ore abound. The county is intersected by the Marietta and Cincinnati railroad. The chief productions in 1870 were 44,292 bushels of wheat, 342,211 of Indian corn, 59,824 of oats, 41,052 of potatoes, 245,714 lbs. of butter, 104,934 of wool, 110,739 of tobacco, and 12,341 tons of hay. There were 3,205 horses, 3,066 milch cows, 6,741 other cattle, 29,405 sheep, and 6,781 swine; 1 manufactory of charcoal, 1 of pig lead, 4 tanneries, 4 currying establishments, 6 flour mills, and 4 saw mills. Capital, McArthur.

VINTON. I. Alexander Hamilton, an American clergyman, born in Providence, R. I., May 2, 1807. He graduated at Brown university, studied medicine at Yale college, and received the degree of M. D. in 1828. After practising three years, he entered the general theological seminary of the Protestant Episcopal church, and was ordained in New York in 1835. He took charge of St. Paul's church, Portland, from November, 1835, till April, 1836, and was then for six years rector of Grace church, Providence. From 1842 to 1858 he was rector of St. Paul's church, Boston; from 1858 to 1861 of the church of the Holy Trinity, Philadelphia; from 1861 to 1870 of St. Mark's church, New York, when he became rector of Emanuel church, Boston. Dr. Vinton has published a volume of sermons (1855) and discourses and addresses. **II. Francis,** an American clergyman, brother of the preceding, born in Providence, R. I., Aug. 29, 1809, died in Brooklyn, N. Y., Sept. 29, 1872. He graduated at West Point in 1830, and was appointed second lieutenant in the third artillery. While stationed at Fort Independence, Boston harbor, he studied at the Harvard law school, and also for two or three years served as civil engineer on several railroads in New England. He was admitted to the bar at Portsmouth, N. H., in 1834; was on duty in the Creek war in Georgia and Alabama in 1836; left the army Aug. 31, 1836, entered the general theological seminary of the Episcopal church, New York, and was ordained deacon in 1838, and priest in 1839. He was successively rector of St. Stephen's church, Providence (1840), Trinity church, Newport (1840), Emanuel church, Brooklyn (1844), and Grace church in the same city (1847). He was elected an assistant minister of Trinity church, New York, in 1855. In 1869 he was made professor of ecclesiastical law and polity in the general theological seminary, New York. He published "Arthur Tremaine, or Cadet Life" (1830); "Lectures on the Evidences of Christianity" (1865); and "Manual Commentary on the General Canon Law of the Protestant Episcopal Church in the United States" (1870), a work received as a standard authority.

VINTON, Justus Hatch, an American missionary, born in Willington, Conn., in 1806, died at Kemendine, Burmah, March 31, 1858. He was educated at the Hamilton literary and theological institution (now Madison university), and in September, 1832, was appointed a missionary to Burmah by the American Baptist board, but did not sail till July, 1834. He was designated to labor among the Karens, and was first stationed at Chummerah, 90 m. above Maulmain, and afterward at Newville. In 1851 he took charge of the Karen theological seminary at Maulmain, where he remained till March, 1852, when he removed to Kemendine, a suburb of Rangoon, still devoting his labors to the Karens.

VIOL. See VIOLIN.

VIOLA (Ger. *Bratsch*, alto; Eng. tenor viol), an instrument of the violin family, having the appearance of a very large violin. It has four strings, of which two are simple gut and two are wound with wire. These strings, tuned in fifths, are A, D, G, C. It stands an octave above the violoncello, and is chiefly used for the middle part in concerted instrumental music. (See VIOLIN.)

VIOLET, the common name for plants of the genus *viola* (of which it is a diminutive through the It. *violetta*), an ancient name, adopted by botanists; the genus is the principal one in the small family *violaceæ* (or *violarieæ*), which includes herbs and shrubs of no economic importance. Besides *ionidium* of the far west, and *solea* of the eastern states (which some now unite with *ionidium*), *viola* is the only representative of the family in the United States. Violets are found in most temperate regions; over 200 species are enumerated, which Bentham and Hooker think may be reduced to half that number. Our native species are nearly all perennials, with a short, thick rootstock; some have leafy and often branching stems, while in others the leaves and naked flower stalks are radical, or spring directly from the rootstock; the five sepals have ear-like projections at the base; the petals, of the same number, are somewhat unequal, with the lower larger than the others, and prolonged into a spur at the base; the five stamens have short and broad filaments, and often slightly cohere with one another to form a ring close around the ovary, the two lower ones having short spurs which project into the spur of the lower petal; the one-celled ovary has a single variously shaped style, with the stigma at one side, and when ripe breaks into three valves, the edges of which fold together and expel the seeds. Many species produce, besides their showy flowers, others in which the petals do not develop; these are hidden among the leaves at the base of the plant, and produce seeds more abundantly than the showy flowers. About 18 species are accredited to the territory east of the Mississippi, three or four of which are also found in Europe, and several are peculiar to the far west.—A convenient subdivision of the species is into stemless and leafy-stemmed violets, these divisions being again subdivided by the color of the flowers, though this character is variable: some of our violets are among the most showy of the genus; they are either quite scentless, or with a very slight odor. In the section of stemless violets, the most common of all is the blue or hooded violet (*V. cucullata*), so called probably because the blade of the long-petioled, heart-shaped leaf has its sides rolled inward at the base when young. This species varies greatly in size, the flower stems being from 3 to 10 in. high; it is very abundant in low grounds, forming large clumps, with its large flowers from deep to pale violet, and sometimes white or variegated with white; varieties of this have been called hand-leaf violet (*V. palmata*), the leaves being variously cleft, and heart-leaf violet (*V. cordata* and *V. villosa*). The arrow-leaved violet (*V. sagittata*) is usually in drier places than the preceding, with narrow and often arrow-shaped leaves. The bird's-foot violet (*V. pedata*) is most abundant in sandy places; its leaves are handsomely cut into narrow lobes; the flowers, the largest of the native species, are usually pale lilac-purple; it is frequently found with white flowers, and in the variety *bicolor* the two upper petals are of a deep violet color and have the velvety appearance of those of the pansy; in its typical form, and in its varieties, this is an excellent plant for the garden, where it forms large clumps which flower nearly all summer. In the west this is replaced by the larkspur violet (*V. delphinifolia*), which differs mainly in the division of the leaves. In this section of stemless violets are three with small white flowers, the lower petal veined with purple; they are common in damp places; the sweet white (*V. blanda*) has kidney-shaped leaves, the lance-leaved (*V. lanceolata*) erect narrow leaves, and the primrose-leaved violet (*V. primulæfolia*) oblong or ovate leaves. The only yellow-flowered species of this section, the round-leaved violet (*V. rotundifolia*), is found in northern cold woods and southward on the mountains.—In the section of leafy-stemmed violets, the most common is the American variety of the European dog violet (*V. canina*, var. *sylvestris*, formerly *V. Muhlenbergii*); it is a low plant with creeping branches, and small light violet flowers, the spur half as long as the petals. The long-spurred violet (*V. rostrata*) is a rather taller plant, the spur being longer than the petals; a species with a similar habit of growth, the pale violet (*V. striata*), has cream-colored flowers, the lower petal of which is marked with purple lines. The Canada violet (*V. Canadensis*) is a taller plant than any of the preceding, growing from 1 to 2 ft. high, and most common northward; the petals are white or purplish, with the two upper ones violet-purple on the under side. There are two yellow-flowered species in this section, which have but few leaves, borne near the top of the stem; the downy yellow violet (*V. pubescens*) has heart-shaped leaves, and is quite common in woods; and the halberd-leaved violet (*V. hastata*), which is quite rare, has leaves of the form from which it takes its name. Among the ten or more species of the far west and the Pacific coast are found representatives of the different subdivisions in which the eastern ones are grouped.—Several European violets are cultivated, the most generally known being *V. tricolor*, the pansy, which has become naturalized in some parts of the country, and the field pansy (var. *arvensis*), which is so common a weed in England, is sometimes found growing in the far west as if it were a native. In the wild state the pansy is exceedingly variable, and more than a dozen species have been made of it by European botanists; it is an annual, a biennial, and sometimes a short-lived perennial, with branching angled stems, variously shaped leaves, and very large, leaf-like lobed stipules; the flowers are variable in color, being purple, whitish, or yellow, with sometimes all three colors in the same flower in the wild plant. The pansy has long been in cultivation, and is generally popular, as is shown by the great number of names and fan-

Bird's-foot Violet (Viola pedata).

Pansy (Viola tricolor).

ciful sobriquets it has received in different countries; besides pansy (Fr. *pensée*, thought), it is frequently called heartsease, a name originally given to the gilliflower, which was supposed to have cardiac qualities, and in some manner transferred to this; in this country it is often called "none-so-pretty," and sometimes "Nancy-pretty," a name that in England is given to London pride (*saxifraga umbrosa*); among its curious names are "love in idleness," "kiss me at the garden gate," "Johnny jump up" (or "jumper"), "pink of my John," and "jump up and kiss me." In cultivation the flower is often 2½ in. or more across; a perfectly formed flower must have a circular outline, with equal and flat petals, and a thick substance. To succeed with pansies in this country, the seeds should be sown in autumn, and the plants, set in a shaded situation, will flower in early spring; our hot sun so affects the plants that the finest varieties if exposed to it produce only small flowers; some cultivators keep the plants in a shaded frame to prolong the duration of the bloom. Choice varieties are sometimes continued by cuttings, especially the double ones, of which several, including a pure white, have been introduced. —The sweet violet (*V. odorata*), widely distributed over Europe and Russian Asia, is much prized as a garden plant on account of its fragrant and modest flowers; though belonging to the stemless section, it throws out creeping runners by which the plant is multiplied; its leaves are broadly heart-shaped, scalloped on the edges, and more or less downy; the flowers are upon long peduncles, nodding, and of the bluish-purple color which is named after them. In cultivation many varieties have been produced; some have full double flowers, with colors ranging from white to the deepest purple, and varying much in size; among the later fine varieties are the Czar and Victoria Regina, with large dark-colored flowers. The ordinary form is quite hardy in our gardens, but the variety called Neapolitan, producing a great abundance of pale flowers, is tender; they must have a partial shade to succeed. This violet is in great demand for bouquets and other floral work, and the florists endeavor by forcing to have the flowers all winter, the Neapolitan being the principal variety used. The horned violet (*V. cornuta*), from the Pyrenees, is much used in Europe as a bedding plant; it produces large pale purplish flowers for a long while, but does not succeed well in our hot summers.—Most of the violets contain an emetic principle, especially in their roots, which is called violine, and has properties similar to emetina obtained from ipecacuanha; the flowers are laxative, and the sirup of violets is used as a laxative for infants. The sirup may also be used as a test for acids and alkalies. The roots of *ionidium* produce some varieties of white or false ipecacuanha.

Sweet Violet (Viola odorata).

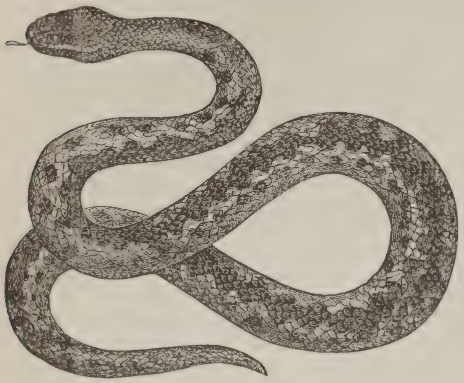
VIOLIN, a stringed musical instrument, played with a bow, which in its earlier forms is of great and uncertain antiquity, but which assumed its present form about the beginning of the 16th century. Its British name *crwth* became crowd; its Anglo-Saxon name *fythel*, fiddle. A small violin was also called a kit. It has four strings tuned in fifths, E, A, D, G, the lowest giving what is known as the middle G, that which is written on the fourth space of the bass clef. This string is wound with wire; the others are of gut unwound. The body of the instrument consists of a sounding board, or belly, which is always of straight-grained deal, and a back of corresponding shape, which is usually of maple, but sometimes of sycamore, or, in very old instruments, of pear wood. From the middle of the upper part stretches the neck, which ends in a small box ornamented with a scroll, or rarely with a carved head of man or beast. Upon the neck is the finger board, of ebony, which until the middle of the last century was much shorter than it is at present. The necks of all old instruments were also short, and have to be lengthened for modern use. The strings are fastened at the lower end to a movable tail piece, generally of ebony, and stretched across a bridge of beech wood, the feet of which rest upon the belly. The tension of the strings is regulated by four pegs which run at right angles through the box at the end of the neck. The wood of the belly and of the back, and also of the sides which separate and sustain the two former, is very thin, being in the violin proper not more than an eighth of an inch in the thickest part, which is in the middle under the bridge. To enable this fragile structure to sustain the great pressure produced by the tension of the strings, which in the violin proper was of old about 65 lbs. and is now about 90 lbs., the belly and the back are arched from end to end and from side to side. This arching is produced, not by bending the wood, but by cutting it out with gouges and tiny planes; and in the height and the proportions of this arch consists chiefly the style of the various schools of violin making, the other traits being the outline and the form of the scroll. In a well designed, well made instrument, all these lines are harmonious, and make the instrument as a whole a very beautiful work of art. A very important adjunct to the exterior of the violin is the varnish, which in good instruments is of exquisite fineness and color. Varnish is also a very marked trait of school and style in violin making. The tension of the strings is supported not only by the arching of the belly and the back, but by the bass bar and the sound post. The former is a thin piece of wood glued lengthwise to the belly and stretching nearly from one end of the instrument to the other, under and in the direction of the bass or lowest string. It is vertically much deeper through the middle than at either end, where in fact it tapers away until it seems to vanish into the belly. The sound post is a small cylindrical piece of wood, about an eighth of an inch in diameter, which stands firmly pressed between the back and the belly just behind the foot of the bridge under the E string. The tone of the instrument depends in a great measure upon the proportions and adjustment of the bass bar and the sound post, and upon the quality of the wood of which they are made. The movement of the sound post even $\frac{1}{32}$ of an inch will make a difference in the quality and volume of tone; so that in French it is called *l'âme du violon.* In the belly of the instrument are two sound holes, made (for ornamental purposes) in the shape of an Italic *f*, turned toward each other. They are in the waist of the instrument, on either side of the bridge. Their form and size is another marked trait of the styles of different violin makers. When what may be called the rudimentary violin first made its appearance, it was in the shape of half a pear, cut from stem to blossom end, a form still seen in the mandolin. This form was very inconvenient for the use of the bow, which could not be applied to either of the outer strings without touching the sides of the instrument, which was widest near the middle. To do away with this difficulty, the sides were cut out in two curves corresponding inversely,) (, which, by making the instrument narrowest where before it was widest, allowed the free passage of the bow, and thus gave the violin nearly its present form. At what time it assumed this form we do not exactly know; but in a stained glass window in Peterborough cathedral, which is of the 12th century, is a figure playing upon a violin which has bowing curves and is much like the modern instrument, having even sound holes of the *f* form, but four in number, and not by the side of the bridge but at either end, two and two. The violin, however, did not come at that time into use as an instrument of high quality. For centuries it was used only by the lower order of minstrels and jongleurs.—The instrument which first took the place now occupied by the violin was the viol. This had 5, 7, 9, and even 12 or 15 strings, but its distinctive trait was that the finger board, instead of being smooth, had frets like that of a guitar. There were treble, tenor, and bass viols, the last being called, from its being held between the legs, *viol da gamba.* In the 16th and 17th centuries it was not uncommon for a gentleman to have a chest of viols in his parlor. Accurate playing and a *cantabile* style were of course both impossible upon an instrument the notes of which were fixed by frets; but the viol long maintained its superior position, and it was not until about the middle of the 17th century that the violin asserted its absolute supremacy; and the viol, especially the *viol da gamba,* did not pass out of use till about 1725.—In this article the names of celebrated makers are given as they appear on their labels, though often differing from the common forms. The earliest maker of the modern violin whose instruments are well authenticated is Gaspard di Salo, who worked between about 1560 and 1612. To one other maker before him, Gaspard Duiffoprugcar, many existing instruments are attributed; but it is, to say the least, doubtful whether these instruments are authentic, and whether he made anything else than viols and lutes. The Italian school of violin making had its rise in Brescia, and, as far as we know, was founded by Gaspard di Salo. The Brescia school had very marked traits, of which a low arching of the back and belly, straight and very open *f* holes, a much involuted scroll, and a double purfling around the edges are the most striking. The chief maker of this school is Giovanni Paolo Maggini (about 1590–1640), whose instruments still hold a place in the first rank. But ere long the Brescia makers were eclipsed by those of Cremona, which little town has been made famous by a succession of great makers, of whom the Amati family were the leaders and for generations the best. (See AMATI.) The work of the first of the Amatis, Andrea, shows the influence of Gaspard di Salo. He adopted Gaspard's straight open *f* hole, but cut it with a more timid hand. He made his instruments of a high model, that is, with the arch of the belly and the back much raised, probably expecting thereby to gain in tone as well as in strength of make; but on the contrary he lost in power, although his instruments are very sweet in tone. This high modelling became characteristic of the Amatis, and of their pupils for some generations. Andrea's sons Antonius and Hieronymus made great advances in their art. They changed their father's model for the better, modified the outline and the form of the *f* holes, lowered the arch somewhat, and finished their work more highly. Upon their instruments the famous Cremona varnish first appears in all its beauty—at once soft, rich, and brilliant in color, and as clear as crystal. The making of this varnish, of which the medium was oil, appears to have been no secret; but the art has been lost for about a century, although great pains and much money have been expended in the endeavor to recover it. It is sometimes red, sometimes brown, and sometimes yellow; but in its best and most beautiful form it is of a clear dark amber color, and indeed makes the violin appear as if it were coated with a thick film of that precious fossil gum. Nicholas, son of Hieronymus, is one of the three great Cremonese makers, the other two being Guarnerius and Stradivarius. Nicholas still further modified the Amati pattern by lowering the arch. He lengthened the *f* holes and added grace to their curve. He was very choice in the selection of his wood and in his varnish, under which the backs of some of his instruments (cut so as to show both grains of the wood) flash like the sides of a richly colored fish, while the bellies have a soft silken surface. He made two patterns: one in his earlier years, which was rather small, and in his mature and later period a large one, the instruments which he then made being known as the "grand Amatis." Andrea Guarnerius (Guarneri) was the next of the great Cremonese makers. He was a pupil of Nicholas Amati, whose pattern he followed, but reduced yet again the height of the modelling. His workmanship is not equal to that of Nicholas Amati, but his instruments are in high repute, and his violoncellos are particularly fine. He was followed by his son Joseph, who was a great maker and formed a style of his own. He modified the bowing curves, narrowing the instrument at the upper part of the waist, but giving it a large outward sweep below. He adopted the pointed form of Gaspard di Salo's *f* hole, but not its width, thus introducing what is known as the Guarnerius *f* hole, one of the most characteristic forms that appear in the history of violin making. Other members of the Guarneri family were violin makers; but the greatest of the name was Joseph Antony, who did not use his second christened name, and who is called Joseph del Gesù, to distinguish him from the other Joseph, and because of a cipher consisting of a cross and the monogram I. H. S. which he printed on his labels. Joseph Guarnerius del Gesù, a nephew of Andrea, was born with a genius for violin making. The dates of the birth and death of these great makers are rarely known; for in their day they were mere hard-working artisans, who sold for a few florins instruments which now command hundreds and sometimes thousands of dollars. But we know that Joseph del Gesù was born June 8, 1683. His originality is shown by the fact that he was in no respect an imitator of Antonius Stradivarius, who had during his lifetime the reputation of being the greatest of violin makers, and who was 40 years older than Joseph del Gesù. The outline, the modelling, the *f* holes, and the scroll of Guarnerius all differ from those of Stradivarius, and are full of character. His workmanship was rarely very fine, rather bold than highly finished; but his instruments have a tone which for breadth, richness, and a peculiarly penetrating human quality, has never been surpassed, if indeed it has been equalled. He did not work by rule apparently, for his instruments differ somewhat in outline and even in the thickness and proportion of the wood; but they all show his unmistakable style. They all have a noticeable breadth in the waist, owing to the comparative shallowness of the bowing curves; and their tone is probably due in a great measure to this peculiarity. A fine specimen of his work in perfect preservation is worth from $2,000 to $2,500. We now turn back to Antonius Stradivarius, who, although he was not the superior or perhaps the equal of Joseph Guarneri del Gesù in natural gifts, we may almost say genius, stands confessed as the greatest of all violin makers. He was born in 1644, and became a pupil of Nicholas Amati, whose pattern he at first adopted without change, so that it is difficult to distinguish his earlier violins from those of his master. What he did indeed was to carry the principles of Nicholas Amati to perfection. He worked almost scientifically and by rule. He had three periods: the first was imitative; in the second he narrowed the waist of his instruments, producing in this way what is known as his "long" pattern, which is long only because of its proportions; and in the last he perfected his style. He reduced the swell of the arching to the lowest possible point, carrying it gently to the very edge of the instrument. He also straightened somewhat the upper curve of the outline, thereby increasing the vibrating surface. He adopted what appears to be the best proportion of thickness in the wood, his bellies and backs diminishing gradually from the middle line to the edges; the result being a remarkable firmness, evenness, and equality of tone on all the strings and in all the positions. He brought the *f* hole to the perfection of proportion and grace of outline, and the same may be said of his scroll, which has no peculiar character like the Amati, the Guarnerius, and the Stainer *f* holes, its proportions being so perfect that it cannot be caricatured. His workmanship was absolute perfection, and his varnish soft, rich, brilliant, and generally of a dark amber color, but sometimes red or reddish brown. The wood that he used was selected with the utmost care both for vibratory power and beauty of grain. In brief, he left nothing to be desired, except perhaps a little more expression of individuality. (See STRADIVARI.) A fine Stradivarius violin commands from $1,500 to $3,000, and in the case of celebrated instruments even more. Violoncellos are considerably less in price, owing only to the smaller demand for them. A very celebrated violin maker was Jacob Stainer of Absom in Tyrol, born about 1620. He has been said to have studied his art with the Amatis, and has therefore been reckoned among the Italian school; but there is no evidence whatever that he worked with either of the Amatis, and his violins do not show any of the elements of their style. His model was very high, the arching very sudden at the sides and ends, the middle line of the belly being almost straight for two thirds of the length of the instrument. His *f* holes and scroll are peculiar, and are inferior in grace to those of the Cremonese makers, of whose models they show no influence. His instruments have a pure, sweet tone, but are inferior in power to those of the best Cremona make. They are gradually losing the high estimation in which they were once held; but fine specimens are worth from $500 to $1,000.—The name "violin," used generically, includes all the instruments of the violin family, of which, however, all have passed out of use except the violin proper, the viola or tenor violin, and the violoncello. The same principles apply to the modelling and to the manufacture of all these instruments, and the great makers produced specimens of all, the violins being greatly in excess. The violoncello, however, is not an enlargement of the violin, nor a modification of the bass viol which it has displaced, but a reduction of the violone, a large bass instrument, like the double bass or contra-basso, if indeed not identical with that instrument. This fact is recorded in the name, which is the Italian diminutive of *violone.* (See VIOLA, and VIOLONCELLO.) The principal makers of the violin, those whose reputations are sufficiently high to make their instruments sought for their names' sake, are, in addition to those already mentioned: *Italian*—Cremona: Giofreda Cappa, 1590–1640; Lorenzo Guadagnini, 1695–1735; Johannes Baptista Guadagnini, 1710–'50; Francesco Ruggieri, detto il per, 1668–1728; Johannes Baptista Rugerius, 1725; Carlo Bergonzi, 1718–'55; Thomas Balestrieri, 1750; Carlo Giuseppe Testore, 1690–1720; Lorenzo Storioni, 1762–'98, the last of the great school of Cremona. Naples: Alessandro Gagliano, 1695–1730. Venice: Franciscus Gobetti, 1690–1715; Domenicus Montagnana, 1700–'40; Sanctus Seraphino, 1710–'48. Milan: Paolo Grancino, 1665–'92 (a family of this name were makers of repute for some generations at Milan); Carolus Ferdinandus Landolphi, 1750. Rome: David Techler, 1680–1743. Florence: Giovanni Baptista Gabrielli, 1750. Monaco: Paolo Aletzie or Allechi, who was celebrated for his bass instruments. *German*—Jacobs, 1690–1740, who made imitations of Nicholas Amati so excellent that they are often mistaken for originals; a family named Kloz in Tyrol, of whom the greatest was Egidius; Joachim Tielke, about the end of the 17th century. *French*—Nicolas Lupot, 1785–1817; Pique, about 1790, a very successful imitator of Stradivarius; Vuillaume, 1790–1875. *English*—Barak Norman, 1688–1740, the first English maker of violoncellos; William Forster, about 1760 to 1808, celebrated for his violoncellos; Richard Duke, about 1765; Benjamin Banks, died 1795; Edward Betts, a pupil of Duke. The dates given with these names are generally those of the years during which the makers worked, the dates of their birth and death being rarely known. Imitations of the works of the great violin makers are produced in great quantities at Mirecourt in France and at Mittenwalder in Tyrol. Some of the more carefully made of these, being artificially disguised with the marks of age, will deceive any but a practised eye. A ticket with the name of a great maker is absolutely worthless as a testimonial of authenticity. These tickets are imitated, as well as the instruments, dark paper and antique type being used. Genuine tickets from disabled instruments are also affixed to other violins, new or old. An old violin is not necessarily a good one; but age and careful use add largely to the excellence of an instrument well designed and well made.—The origin of the bow is even more obscure than that of the violin, as might reasonably be expected; but there is pretence, with some little ground, that it came first into use in England. In its earliest form it was nothing more than a segment of a hoop of elastic wood, with a rude handle, and with a few hairs stretched from heel to point. This form and structure it retained with little essential improvement for centuries. So late as the beginning of the 18th century it was short, curved, and heavy, and without any means of adjustment. About 1730–'40 Tartini doubled its length, lightened it, and gave it a movable nut at the hand end. By this improvement he made the modern style of playing possible. But still the bow was curved, and its elasticity was comparatively little. David Tourte of Paris, a bow maker and the son of a bow maker, who at first made bows after the Tartini pattern, conceived the idea of making this implement of very tough, elastic wood, with a curve downward toward the hair, so that when the hair was drawn tight the bow became straight. He also added the screw and button. This is the modern violin bow, which according to the judgment of all violin players leaves nothing to be desired. As sometimes happens, the inventor carried his invention at once to perfection. Tourte's bows are the best that are known, and so important is it to a violin player to have the best bow he can obtain, that good Tourte bows command from $75 to $150, entirely irrespective of the manner in which they are mounted; and even at those prices are very rarely to be bought. Tourte died at a great age in 1835. Other bow makers of high repute are Dodd, Panormo, Bausch, and Vuillaume.—Other instruments of the violin family than those already named are, or were, the rebec, the ribible, the gigue or geig, the chelys (a kind of bass viol), the lyra da gamba, the viol bastarda, the posche (which was a small pocket instrument), the barbiton minor and barbiton major, the viol d'amour (which had six strings of gut with strings of wire beneath tuned in unison and vibrating with the other), the quinte, the barytone, the viola de bardone (said to have had 44 strings), the leero viol, and the linter-colo or sordino. All these instruments have long been obsolete, and are known only as existing in the cabinets of the curious or by mere name.—The first really great violin player of whom we hear, and without a doubt the first that appeared, was Arcangelo Corelli, in the latter half of the 17th century. He was also the first composer of merit for his instrument whose works have come down to us. Contemporary with him was Schnittelbach of Lübeck, who left a great reputation. From their time there has been a succession of great artists, of whom the most famous are Thomas Baltazar, Nicolas Matteis; Tartini (born 1692), already mentioned, whose lengthening of the bow introduced an entirely new style; Rotta, Diana (a Cremonese), Viotti, Geminiani, Dubourg, Giardini; Paganini (born 1784, died 1840), an artist of original genius and prodigious powers of execution, but of questionable taste, who is the father of the modern virtuoso style; De Bériot, Ernst, F. David; Louis Spohr (born 1784, died 1859), whose style was pure and classical, and who was also a composer of eminence; Molique, Ole Bull, Sivori, Vieuxtemps, Sainton, Wieniawski, and Joachim. Of these the last six are living. The first great violoncello player that we hear of was Torqueray, born in 1700. He has been succeeded by Franceschelli, Buononcini, Bertrand, the two Jansons, Luigi Boccherini (born 1740, died 1806), who was also a composer of enduring reputation, Romberg, Dotzauer, Servais, Max Bohrer, Linley, Knoop, Piatti, De Swert, and Frederick Bergner; the last named has long resided in the United States. The contrabasso, or double bass, is used almost entirely to give weight and volume to the bass part in orchestral compositions; but two great solo performers upon it are known to fame, Dragonetti and Bottesini, who played violoncello and even violin music upon their unwieldy instruments, and the latter of whom gained his first distinction in America. (See BOTTESINI, and DRAGONETTI.)

VIOLLET-LE-DUC, Eugène Emmanuel, a French architect, born in Paris, Jan. 27, 1814. He early studied Gothic architecture, and in 1836–'9 studied in Italy the remains of Greek and Roman art. Since 1840 he has been employed in the restoration of churches, castles, town halls, fortifications, and other public structures in France, among them the cathedral of Notre Dame in Paris, the fortifications of Carcassonne, and the Pierrefonds castle. In 1863 he became professor of the history of art and æsthetics at the school of fine arts. He is also a designer and painter in water colors. His principal works are the illustrated *Dictionnaire raisonné de l'architecture française du XI^e au XVI^e siècle* (10 vols., 1853–'68), with its companion or continuation the *Dictionnaire raisonné du mobilier français de l'époque carlovingienne à la renaissance* (1855–'75); *Essai sur l'architecture militaire au moyen âge* (1854; English translation by M. Macdermott, London, 1860); *Entretiens sur l'architecture* (vol. i., 1863; vol. ii., 1872; English translation of vol. i. by H. Van Brunt, Boston, 1875; of both by B. Bucknall, 2 vols., London, 1876); *Histoire d'une maison* (1873; English translation by M. Towle, Boston, 1874, and by B. Bucknall, London, 1874); *Histoire d'une forteresse* (1874; English translation by B. Bucknall, London and Boston, 1875); and *Histoire de l'habitation humaine* (1875; English translation by B. Bucknall, London and Boston, 1876).

VIOLONCELLO, an instrument of the violin family, with four strings tuned in fifths, A, D, G, C, the last two of which are wound with wire. It is held between the legs of the performer, and has taken the place of the old *viol da gamba.* It is a bass instrument, the C string giving that note on the second line below the bass clef; but its tone is the noblest and most touching of all the instruments of the violin family. (See VIOLIN.)

VIOTTI, Giovanni Battista, an Italian violinist, born at Fontanetto, Piedmont, about 1755, died in Brighton, England, March 3, 1824. He studied under Pugnani, who enjoyed the highest reputation in his day. Before he had attained his majority Viotti was appointed first violinist in the royal chapel in Turin. He afterward visited Berlin, Paris, and other cities, and was regarded as one of the greatest virtuosos of his day. During the French revolution he held for a time a seat in the constituent assembly, but fled to London when the reign of terror began, and was for a short period leader of the band in the King's theatre. A report being circulated among the French *émigrés* then in London that Viotti had been a secret agent of the revolutionists, he was obliged to quit the country. He went to Hamburg, but after a few years returned to London, and lost all his property in the wine trade. After the restoration of the Bourbons he assumed the direction of the royal academy of music at Paris, in which he met with no success. His remaining years were spent in England. He is now remembered chiefly by his *Six duos concertans pour deux violons,* published at Hamburg.

VIPER (Lat. *vivipara,* bringing forth young alive), the common name of the *viperidæ,* a family of old world venomous serpents, distinguished from the rattlesnakes of the new by the absence of pits on the sides of the face and rattles on the tail. There are about 20 species, most abundant in warm climates, and especially in Africa; three species occur in Europe. The common European viper or adder (*vipera* [*pelias*] *berus,* Daud.) rarely attains a length of more than 2 ft.; the general color is yellowish or olive brown, with a double row of black spots on the back, sometimes united into bands, and paler on the sides with black spots; the single abdominal scutes are about 140, and the caudal 40 to 43 pairs; the eyes are small and very brilliant. It is distributed over Europe, from Sweden and N. Russia to the Mediterranean; it is the only venomous reptile found in Great Britain, where it is common in some parts, especially on the heaths and in the hedges of dry stony districts. Unlike the common snake, it faces any suspected enemy, with body closely coiled, head and neck raised and ready to strike as soon as it comes within reach; dogs when hunting are frequently bitten, but not often killed. Its poison is powerful enough to produce very painful and occasionally dangerous effects, particularly in warm regions and in debilitated constitutions; after a viper bite there is acute pain in the wound, with livid swelling, faintness, quick and irregular pulse, nausea and vomiting, and cold sweats. The remedies relied upon by viper catchers are draughts of olive oil and embrocations to the limb in front of a fire; the application of cupping glasses to the wound, and the internal administration of ammonia or of alcoholic stimulants, are generally sufficient. The viper remains torpid in winter in holes, many being twined together; the young are born alive, 12 to 20 at a birth, the membrane of the eggs, according to Bell, being burst at the moment of exclusion; the food consists of insects, worms, mice, shrews, young birds, &c.—The horned viper (*cerastes Hasselquistii*, Laur.) is about 14 in. long, in color above ranging from ashy gray to yellowish red and even much darker, with indistinct spots, and pale rose below with a pearly lustre; the scales are lancet-shaped and strongly ridged; the head is triangular, and made very distinct from the neck by the prominence of the angles of the jaws; near the middle of each arched eyebrow in the male is a slender, pointed spine or horn, slightly bent forward, which, though not a weapon, gives the head a malignant look; the body is thick, and the tail short and suddenly pointed. It is found in northern Africa, Arabia, and western Asia, and was well known to the ancients; it is the serpent represented on the Egyptian monuments, and has been supposed to have been the asp by which Cleopatra destroyed herself. (See Asp.) It is indolent in habit, remaining buried in the hot sand till aroused by hunger or attacked, when it is very active, springing 2 or 3 ft.; when it bites it retains a firm hold, and makes no haste to escape like most serpents. A species named *nasicornis*, perhaps a variety of the last, is found in W. Africa; it is about 3 ft. long and 9 in. in circumference, its horns giving it a very repulsive look; it feeds principally on rats, small reptiles, and fish of marshy places; its bite is much dreaded by the natives, and is often speedily fatal; they suck the wound, make a free incision, and apply the juices of particular plants; it makes its presence known by a sound like a suppressed groan, followed by a hissing or blowing sound; it darts forward from its powerful tail as a fulcrum. The common cerastes is still a favorite species with Arabian snake charmers in their public exhibitions. The short-tailed viper or puff adder (*V.* [*clotho*] *arietans*, Schl.), from the Cape of Good Hope, is the most deadly serpent of S. Africa; it is about 3 ft. long and 2 in. in diameter, brown, with an angular cross band, a pale line behind it and a red band across the eyes. —The viper is one of the reptiles which have a distribution very far north, and the furthest of the snakes. It is popularly believed to take its young when in danger into its throat; though some have declared this impossible, there is reason to believe it true, according to Dr. Crisp ("Proceedings of the Zoölogical Society of London," 1855, p. 191).



Common European Viper (Vipera berus).

VIRCHOW, Rudolf, a German physiologist, born at Schivelbein, Pomerania, Oct. 13, 1821. He studied at the Pépinière in Berlin, received his medical degree in 1843, and became assistant physician and subsequently prosector at the Charité hospital, lecturing at the same time on anatomy in the university. In 1848 the Prussian government sent him to Silesia to investigate the nature of a typhoid epidemic raging there, and in 1849 he accepted a chair of pathological anatomy at the university of Würzburg, having been deposed in Berlin on account of his liberal politics. The Berlin university recalled him in 1856 to the same chair, and the government made him director of the pathological institute of the Charité. The Bavarian government had invited him in 1852 to investigate the causes of a famine in the Spessart, and in 1859 the king of Sweden requested him to explore the western provinces of Norway in regard to the leprous diseases prevalent there. On his return to Berlin he was elected to the city council, and in 1862 he became a member for the district of Saarbrück of the house of representatives, in which he took an active and prominent part on the opposition side. Since 1867 he has represented the city of Berlin in the same assembly. During the wars of 1866 and 1870–'71 he was a director of hospital service. His fame rests mainly on his labors in cellular pathology, of which science he may be considered the founder; but more recently he has turned his attention to anthropological and archæological studies, and distinguished himself as an investigator of the lacustrine habitations and other prehistoric settlements in Germany, and by his researches on the anatomy of the brain. In 1871 he engaged in an interesting contest with the French ethnologist Quatrefages, who maintained in his work on *La race prussienne* that the Prussians proper are of Finnic descent. Virchow founded in conjunction with Reinhardt the *Archiv für pathologische Anatomie und Physiologie und für klinische Medicin*, and he has been sole or joint editor of various scientific publications. His principal works are: *Handbuch der speciellen Pathologie und Therapie* (3 vols., 1854–'62); *Untersuchungen über die Entwickelung des Schädelgrundes* (1857); *Die Cellularpathologie in ihrer Begründung auf physiologische und pathologische Gewebelehre* (1858; 4th ed., 1871); *Ueber die Natur der constitutionell-syphilitischen Affectionen* (1859); *Goethe als Naturforscher* (1861); *Vorlesungen über Pathologie* (4 vols., 1862–'7); *Darstellung von der Lehre der Trichinen* (1865); *Der erste Sanitätszug des Berliner Hülfsvereins* (1870); *Ueber Lazarethe und Baracken* (1871); *Die Aufgabe der Naturwissenschaften im nationalen Leben Deutschlands* (1871); and *Die altnordischen Schädel zu Kopenhagen* (1871).

VIREO, or **Greenlet,** a common name of a family of American insectivorous birds, coming near the shrikes in the form of the bill and in some of their habits. The general plumage is more or less tinted with green and olive. In the typical genus *vireo* (Vieill., since subdivided by Prince Bonaparte into *vireosylvia* and *vireolanius* or *lanivireo*), the bill is short and strong, nearly straight, notched and hooked at the tip, with a few weak bristles at the gape; wings long and pointed; toes moderate, the lateral ones partly united to the middle at the base, and capable of holding their insect prey as in the shrikes; tail moderate and even. There are about 20 species, all small, migrating from South America and the West Indies to the United States, arriving here about May, breeding in summer, and returning in autumn; many are sweet singers. They are very active, feeding on insects and their larvæ, which they take on trees or on the wing, and sometimes on berries; the nest is made in trees and bushes, of dried leaves, grasses, roots, moss, and lichens, and is generally pendulous; they exhibit great jealousy of any intruder on their retreats, and scold and chatter in a most extraordinary manner; most have two broods in a season, with four or five eggs, white with brown or black spots; their nests are often selected by the cowpen bird for the reception of its parasite eggs. The red-eyed vireo (*V. olivaceus*, Vieill.), the type of *vireosylvia*, is 6½ in. long and 10½ in. in alar extent; the upper parts and tail are bright olivaceous green; crown ashy, bordered on each side by a dusky line within a white superciliary one; nearly pure white below, under tail coverts with a faint sulphur tinge; iris red. It is found from the eastern United States to the Missouri, S. to Texas and Central America, and N. to Greenland. The nest is very neatly made, suspended from twigs 4 or 5 ft. from the ground; besides the usual materials, it includes bits of hornets' nests, flax, and paper, glued together, according to Wilson, by the silk of caterpillars and the bird's saliva; it is so durable that other birds, like the yellow bird, have been known to build in the preceding year's nest; even mice have sometimes occupied it after the bird has left it. A more southern species, much resembling this, the *V. barbatulus* (Baird), is popularly called "Whip-Tom-Kelly," from a fancied resemblance of its notes to those words; Mr. Gosse thinks they resemble more "John-to-whit," and Dr. Bryant adds to the former the syllables "pheuu, wheuu," much prolonged.—The white-eyed vireo (*V. Noveboracensis*, Bonap.) is about 5 in. long and 8 in. in alar extent; it is olive-green above and white below; ring around eyes, extending to bill, greenish yellow; two bands on wings and edge of inner secondaries white; sides of head and breast strongly tinged with yellow; iris white. It is found in about the same extent as the preceding, but not so far north; it so often introduces fragments of newspapers into its nest, that it goes in some places by the name of the politician. —The solitary vireo (*V.* [*lanivireo*] *solitarius*, Baird) is 5½ in. long and 9¼ in. in extent of wings; head and neck above dark bluish ash, rest of upper parts olive-green; white ring around eyes, extending interruptedly to bill; lower parts, two bands on wings, and edge of secondaries white; under wings greenish yellow. It is found in the United States from the Atlantic to the northern Pacific.

Red-eyed Vireo (Vireo olivaceus).

VIREY, Julien Joseph, a French physician, born at Hortes, Champagne, in November, 1775, died in Paris, March 29, 1846. He was educated at Langres, and studied in the hospital of Val de Grâce at Paris, of which he became chief pharmaceutist in 1812, but resigned soon after, and two years later received the diploma of doctor of medicine from the faculty of Paris. He was a member of the superior council of health, and from 1831 to 1838 held a seat in the chamber of deputies. He edited the *Journal de pharmacie*, and wrote the majority of the general articles in the *Dictionnaire des sciences naturelles* of Déterville and the *Dictionnaire des sciences médicales* of Panckoucke. Among his works are: *Histoire naturelle du genre humain* (3 vols., 1801); *Histoire naturelle de la femme* (last ed., 1825); *Art de perfectionner l'homme* (2 vols., 1808); *De la physiologie dans ses rapports avec la philosophie* (1814); *Histoire des médicaments, des aliments et des poisons* (1820); and *Philosophie de l'histoire naturelle* (1835).

VIRGIL (PUBLIUS VIRGILIUS, or VERGILIUS, MARO), a Roman poet, born at Andes, a small village near Mantua, Oct. 15, 70 B. C., died in Brundusium, Sept. 22, 19 B. C. His birthplace, according to an old tradition, is the same as the modern village of Pietola. His father was the owner of a small landed estate, and the son received his early education at Cremona and Mediolanum (Milan), and assumed the *toga virilis* at the former city in 55. Afterward he studied Greek at Naples under Parthenius, was a pupil of Syron the Epicurean, and throughout his whole life was a student of history, antiquities, medicine, agriculture, and mathematics. Being naturally of a delicate constitution, and not entitled by birth to the rights of a Roman citizen, he never attempted to gain distinction either by oratory or arms, and seems to have retired to his father's estate near Mantua. He lost this estate at the time of the agrarian division, but obtained it again through Asinius Pollio, who was one of the first to recognize his poetical talent. He was afterward befriended by Mæcenas, and became a favorite of Augustus; but, being of a rather retiring nature, he spent the latter part of his life mostly outside of Rome, either at Tarentum or Naples, which last appears to have been his favorite residence. In 19 he went to Greece with the intention of remaining in that country several years for the purpose of laboring on the Æneid; but the same year he met the emperor at Athens, and set out with him for Italy, but died on the journey. His remains were carried to Naples, and buried on the road leading from that city to Puteoli.—The earliest works of Virgil were the Bucolics, which were written probably between 43 and 37. Although modelled after the pastoral poems of Theocritus, they are not pastorals in a stricter sense. Many of them treat of matters of present interest, unconnected with any description of rural sights; and the fourth eclogue, addressed to Pollio, does not even pretend to be a pastoral poem. They were however the first of their kind which had appeared in Latin, and, though far inferior to the productions of Theocritus, were exceedingly popular with the Romans. The Georgics form a didactic poem in four books, addressed to Mæcenas, and by far the most finished of Virgil's productions. The first book treats of the proper cultivation of the soil, the second of the management of fruit trees, the third of horses and cattle, and the fourth of bees. The subject seems unpromising for a poem of much interest; but he embellished the monotonous and uninteresting details of agricultural life with apt allusions and skilful ornament, and occasionally with beautiful digressions. The story that he wrote this work at the request of Mæcenas to revive the languishing agriculture of Italy, and that in consequence the country soon assumed a flourishing appearance, is improbable. The Æneid, or the adventures of Æneas after the fall of Troy, is in twelve books, the first six of which were modelled after the Odyssey, and the last six after the battles of the Iliad. Virgil worked at this poem with great deliberation and care, but he did not live to perfect it. He bequeathed it to his friends Varius and Tucca, who at the express wish of Augustus edited it with the utmost care. In the form which it thus received the Æneid became at once the most popular and most highly esteemed poem of the Romans. The poet interwove with the adventures of Æneas allusions to the glories of the Julian line, of which the Trojan hero was the assumed ancestor, and prophecies of the future splendor of the city of which he was indirectly the founder. Although the Æneid as a whole is inferior to the great works upon which it is modelled, and the characters of many of the actors, especially of the chief hero Æneas, are comparatively uninteresting, yet the particular scenes and incidents are treated in the most successful manner and with the highest degree of poetical feeling. Original genius did not belong to Virgil, but his taste, his skill, and his power of versification are unsurpassed. Other poems attributed to him are *Culex*, *Ciris*, *Copa*, *Moretum*, and 14 *Catalecta;* but only the first four larger poems are with good reason supposed to be his. His influence on Roman literature and the literature of the middle ages was almost without a parallel in literary history. His poems were the text books of the Roman youths and the models of the Roman poets. The great men of the middle ages were his admirers and imitators. A sort of religious veneration was felt for him, and various legends came to be connected with his person, which soon transformed him into a magician and conjurer. Petrarch tells us that the grotto of Posilippo was thought in his time to have been excavated by the magic incantations of the poet. Traces of this feeling can be found in the custom of inquiring into the future by the *sortes Virgilianæ.*—Several hundred manuscripts of Virgil's works have come down to our time. They were first printed at Rome in 1469 by Sweynheym and Pannartz. C. G. Heyne published an edition (4 vols. 8vo,

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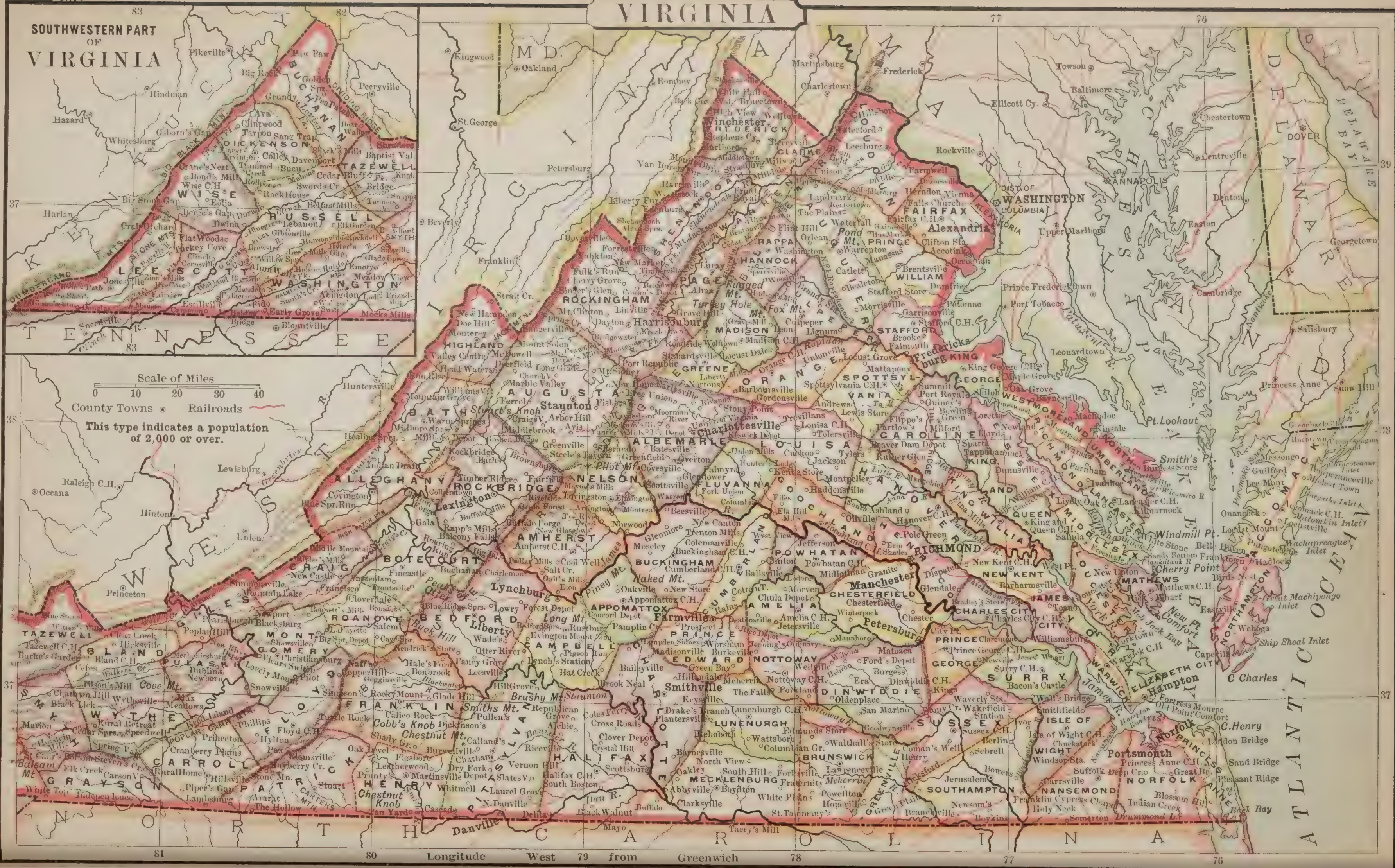
VIRGINIA


SOUTHWESTERN PART OF VIRGINIA
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County Towns ●
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This type indicates a population of 2,000 or over.
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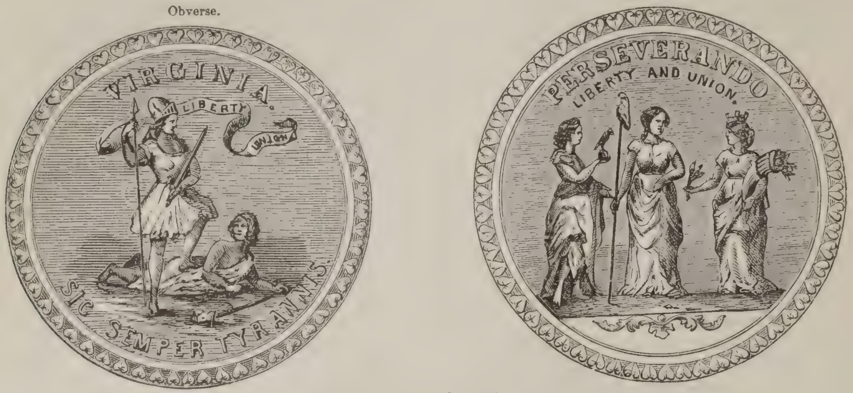
Leipsic, 1767–'75) upon which much labor was spent, and of this an improved edition, by G. P. E. Wagner, appeared in 1830–'41. Valuable for their exhaustive critical apparatus and prolegomena are the later editions by Ribbeck (Leipsic, 1859–'66) and Forbiger (4th ed., Leipsic, 1873). The English notes of the editions by Conington (London, 1858–'71), A. H. Bryce (new ed., London, 1875), and B. H. Kennedy (London, 1876) are also very complete. Dryden's translation of the Æneid (1697) is still very popular. Among the recent English versions are Conington's (1866), Cranch's (1872), and William Morris's (1876). A good translation of the Georgics and Bucolics is Owgan's (1853). The chief authority for Virgil's life is a biography by Donatus. Commentaries were written on his works in ancient times, especially by Macrobius and Servius; the latter is very valuable.

VIRGILIA, a name given by Lamarck to a genus of south African leguminous trees, to which Michaux referred one of the finest of our North American trees, the yellow-wood, as *Virgilia lutea.* As the tree differs, especially in its pods, from the *Virgilia*, Rafinesque made a new genus for it, calling it *cladrastis*, the meaning of which remains unexplained; the correct botanical name of the tree is *cladrastis tinctoria*, but the nurserymen retain it in their catalogues as *Virgilia.* It rarely exceeds 30 or 40 ft. in height, and a diameter of 12 in. The bark, even on old trees, is smooth, and the yellow heart wood readily imparts its color to water. The long leaves have 7 to 11 leaflets, the base of the petiole being expanded to cover the bud of the following year. The flowers, which appear when the tree is quite young, are in loose pendent racemes, 10 to 20 in. long, of the purest white, except a small yellowish spot in the centre of each, and have a slight fragrance; while they have the appearance of the flowers of the tribe *papilionaceæ*, their distinct stamens and other characters place the genus in the tribe *sophoreæ.* The pod, 3 to 4 in. long, is narrow, flat, and four- to six-seeded. The tree is hardy in the climate of Boston, there being a notably fine specimen in the botanic garden at Cambridge. Its moderate size well adapts it for lawn planting; it is interesting at all times, and when in flower is surpassingly beautiful. It is readily raised from seeds.

Virgilia or Yellow-wood (Cladrastis tinctoria).

VIRGINAL, a keyed and stringed instrument, now out of use, somewhat like the spinet, in shape like the pianoforte. Its compass was about four octaves. In the progress of pianoforte manufacture it succeeded the clavichord, brass wire replacing in its construction the catgut strings formerly used. The wires were set in vibration by a quill attached to the tongue of a piece of wood called a jack, which moved upward as the key was pressed down. It probably derived its name from being much used in convents in accompanying hymns to the Virgin.

VIRGINIA, one of the thirteen original states of the American Union, situated between lat. 36° 31′ and 39° 27′ N., and lon. 75° 13′ and 83° 37′ W. Its greatest length from E. to W. is about 440 m., greatest breadth from N. to S. 192 m.; area, according to the federal census, 38,348 sq. m.; according to state authority, 45,000 sq. m. It is bounded N. by West Virginia and Maryland, E. by Maryland and the Atlantic ocean, S. by North Carolina and Tennessee, and W. by Kentucky and West Virginia. It is separated from Maryland on the northeast by the Potomac river. The state is divided into 99 counties, viz.: Accomack, Albemarle, Alexandria, Alleghany, Amelia, Amherst, Appomattox, Augusta, Bath, Bedford, Bland, Botetourt, Brunswick, Buchanan, Buckingham, Campbell, Caroline, Carroll, Charles City, Charlotte, Chesterfield, Clarke, Craig, Culpeper, Cumberland, Dinwiddie, Elizabeth City, Essex, Fairfax, Fauquier, Floyd, Fluvanna, Franklin, Frederick, Giles, Gloucester, Goochland, Grayson, Greene, Greenville, Halifax, Hanover, Henrico, Henry, Highland, Isle of Wight, James City, King and Queen, King George, King William, Lancaster, Lee, Loudon, Louisa, Lunenburg, Madison, Matthews, Mecklenburg, Middlesex, Montgomery, Nansemond, Nelson, New Kent, Norfolk, Northampton, Northumberland, Nottoway, Orange, Page, Patrick, Pittsylvania, Powhatan, Prince Edward, Prince George, Princess Anne, Prince William, Pulaski, Rappahannock, Richmond, Roanoke, Rockbridge, Rockingham, Russell, Scott, Shenandoah, Smyth, Southampton, Spottsylvania, Stafford, Surry, Sussex, Tazewell, Warren, Warwick, Washington, Westmoreland, Wise, Wythe, and York. The chief cities, with their population according to the census of 1870, are Richmond, the capital, 51,038; Alexandria, 13,570; Fredericksburg, 4,046; Lynchburg, 6,825; Norfolk, 19,229; Petersburg, 18,950; Portsmouth, 10,492; Staunton, 5,120; Winchester, 4,447; and Williamsburg, 1,392. The chief towns are Charlottesville, with 2,838, near which is the university of Virginia; Culpeper, 1,800; Danville, 3,463; Farmville, 1,543; Hampton, the seat of the Hampton normal and agricultural institute, 2,300; Harrisonburg, 2,036; Leesburg, 1,144; Lexington, the seat of Washington and Lee university and of the Virginia military institute, 2,873; Manchester, 2,599; Salem, the seat of Roanoke college, 1,355; Warrenton, 1,256; and Wytheville, 1,671. The population of the state and its rank in the Union according to the federal census have been:



Obverse.

Reverse.

State Seal of Virginia.

YEARS.	White.	Free colored.	Slave.	Total.	Rank.
1790......	442,117	12,866	292,627	747,610	1
1800......	514,280	20,124	345,796	880.200	1
1810......	551,514	30,570	392,516	974.600	1
1820......	603,085	36,883	425,148	1,065,116	2
1830......	694,300	47,348	469,757	1,211,405	3
1840......	740,968	49,842	448,987	1,239,797	4
1850......	894,800	54,333	472,528	1,421,661	4
1860......	1,047,299	58,042	490,865	1,596,318	5
1870......	712,089	512,841	......	1,225,163	10

The decrease in 1870 was due to the separation of West Virginia. The total population of the territory now constituting Virginia before 1870 was as follows: 1790, 691,737; 1800, 801,608; 1810, 869,131; 1820, 928,348; 1830, 1,034,481; 1840, 1,017,260; 1850, 1,119,348; 1860, 1,219,630. Included in the total for 1870 were 229 Indians and 4 Chinese. Of the total population in that year, 597,058 were males and 628,105 females; 1,211,409 were of native and 13,754 of foreign birth. Of the natives, 1,162,598 were born in Virginia and West Virginia, 7,344 in Maryland, 4,908 in New York, 16,869 in North Carolina, and 15,497 in Pennsylvania. Of the foreigners, 6,231 were born in Germany, 5,191 in Ireland, and 1,909 in England. The density of population was 31·95 persons to a square mile. There were 231,574 families, with an average of 5·29 persons to each, and 224,947 dwellings, with an average of 5·45 to each. There were 200,103 males and 196,709 females from 15 to 18 years of age, including 85,510 colored males and 85,644 colored females; 206,658 males from 18 to 45, of whom 83,488 were colored; 161,500 white males and 107,691 colored males 21 years old and upward; and 266,680 male citizens 21 years old and upward. There were 390,913 persons 10 years of age and over unable to read, and 445,893 who could not write; of the latter, 31,403 were whites from 10 to 15 years of age, 21,438 from 15 to 21, and 67,997 21 and over; 57,433 were colored from 10 to 15 years old, 57,208 from 15 to 21, and 207,595 21 and over. Of the total population 10 years of age and over (890,056), there were engaged in all occupations 412,665; in agriculture, 244,550, of whom 162,604 were farmers and planters and 80,739 laborers; in professional and personal services, 98,521, including 1,073 clergymen, 54,008 domestic servants, 27,730 laborers, 1,075 lawyers, 2,126 physicians and surgeons, and 2,521 teachers; in trade and transportation, 20,181; and in manufactures and mechanical and mining industries, 49,413. The state contained 895 blind, 534 deaf and dumb, 1,125 insane, and 1,130 idiotic. The total number of deaths from all causes was 15,183, the ratio of mortality being 1·24 per cent.; from consumption 2,095, being one from that disease to 7·2 from all causes; from pneumonia 1,452, or one from that disease to 10·5 from all causes. There were 573 deaths from cholera infantum, 251 from intermittent and remittent fevers, 676 from enteric fever, and 1,026 from diarrhœa, dysentery, and enteritis.—The territory of Virginia presents six great natural divisions extending across the state from N. E. to S. W., nearly parallel, and corresponding to the trend of the Atlantic coast on the east and of the Appalachian range on the northwest. They occupy different levels, rising to the west like a grand stairway. They differ also in respect to geology, climate, soil, and productions. Beginning on the east, they are the tidewater, middle, Piedmont, Blue Ridge, valley, and Appalachian sections. The tidewater country comprises the E. and S. E. part of the state, forming an irregular quadrangle, with an average length from N. to S. of 114 m.

and a width of 90 m. It covers an area of 11,350 sq. m. (according to the state survey), including about 2,500 sq. m. of valuable tidal waters. It borders for about 110 m. on the Atlantic ocean, and is penetrated by the tidal waters of Chesapeake bay and its tributaries, which give nearly 1,500 m. of tidal shore line. It is divided into nine principal and many smaller peninsulas. Beginning on the north, they are: 1, the Northern neck, 75 m. long and from 6 to 20 m. wide, which, lying between the Potomac and Rappahannock rivers, is almost surrounded by navigable waters; 2, the Middlesex, extending S. E. 60 m. with a breadth of from 3 to 10 m., between the Rappahannock and Pianketank rivers; 3, the Gloucester, 70 m. long and from 6 to 18 m. wide, between the Pianketank and the York and Mattapony; 4, the King William or Pamunkey, extending 60 m. S. E. between the Mattapony and the Pamunkey, with a breadth of from 3 to 14 m.; 5, the peninsula which stretches 100 m. S. E., with a width of from 5 to 15 m., between the Pamunkey and the York on the north and the Chickahominy and the James on the south; 6, the Richmond or Chickahominy, 50 m. long and from 5 to 15 m. wide, between the Chickahominy and the James; 7, the Southside, 64 m. long and from 35 to 40 m. wide, embracing all the country S. of the James and between it and the Nansemond river and North Carolina; 8, the Norfolk, embracing the territory between the Nansemond river, Hampton roads, Chesapeake bay, and the Atlantic (partly covered by the Dismal swamp), and having Cape Henry on its N. E. point; 9, the Eastern Shore, a long narrow peninsula comprising the counties of Accomack and Northampton, extending from the Maryland border about lat. 38° to Cape Charles, and forming the eastern barrier between the lower Chesapeake bay and the Atlantic. Along the Atlantic shore of this peninsula extend a series of sand bars or spits with occasional narrow inlets, at a distance of from 2 to 10 m. from the coast, and in some places connected with it by extensive sand drifts. Between these sand spits and the mainland of the peninsula are the Broadwater and other sounds and roadsteads, and in some cases islands of considerable extent. The shores of that portion of the Chesapeake bay within the limits of Virginia are indented by numerous small bays, inlets, and sounds, forming safe anchorage ground for small craft, and abounding in shell fish. The middle country is an undulating plain, with an elevation of from 150 to 200 ft. on the east, and from 300 to 500 on the northwest, which extends W. to the low broken ranges called collectively the Coast range, forming the eastern outliers of the Appalachian system. These extend across the state in a S. W. direction from the Potomac to North Carolina, and comprise the mountains, hills, &c., known as Kittoctin, Bull Run, Yew, Clark's, Southwest, Carter's, Green, Findlay's, Buffalo, Chandler's, Smith's, &c. The middle division comprises about 12,470 sq. m. in the form of a right-angled triangle whose base, about 120 m. long, rests on the North Carolina border. Along the E. base of the Blue Ridge mountains, and between them and the Coast range, the Piedmont division extends from the Potomac and Maryland to the Dan at the North Carolina border. It is 244 m. long, with an average width of 25 m. and an area of about 6,000 sq. m. This division has numerous valleys and rivers, many extensive plains, and much picturesque scenery. The elevation increases toward the west, becoming at the foot of the Blue Ridge from 600 to 1,200 ft. The Blue Ridge, a mountain range with many branches expanding into plateaus or rising into domes, is one of the most prominent features of the topography of Virginia. It stretches across the state in a S. W. direction, and, with its numerous spurs extending in all directions, but especially on the east, its parallel ridges, detached knobs, and foot hills, comprises about 2,500 sq. m. It has a very irregular outline, and rises from 2,000 to 4,000 ft. above the sea, with a general elevation of about 2,500 ft. Near the Potomac the elevation is about 1,460 ft. Mt. Marshall near Front Royal is, according to the United States coast survey, 3,369 ft. high; and the Peaks of Otter in Bedford co., according to Guyot, are 3,993 ft. high. The valley is a part of the great Appalachian valley, which extends from Canada to Alabama. It is a broad belt of rolling country, diversified by hills and valleys with many winding streams, lying between the Blue Ridge on the east and the Kittatinny or North mountains on the west, which comprise numerous parallel ranges with various local names. In Virginia and West Virginia the valley extends for about 330 m. from the Potomac to the Holston, of which about 300 m. are within Virginia; it has an area of 5,000 sq. m. It embraces the valleys of five rivers, viz., the Shenandoah, James, Roanoke, Kanawha or New, and Holston or Tennessee. Its western elevation is from 500 to 1,000 ft. greater than the eastern. The Appalachian division is a mountainous region traversed by the Alleghany ranges. In Virginia it is about 260 m. long and from 10 to 50 wide, and comprises 7,680 sq. m. It consists of a series of comparatively narrow, long, parallel valleys, running N. E. and S. W. and separated by mountain ranges. The highest peak in the state, Balsam mountain (about 5,700 ft.), is in the Iron mountains, between the Blue Ridge and the Alleghany range, on the border of North Carolina.—Virginia has a large number of rivers and streams, which afford abundant water power and extensive commercial facilities. Six sevenths of the state is watered by streams which flow toward the Atlantic, and the remainder by those which reach the Ohio through the Great Kanawha, Tennessee, and Big Sandy rivers.

The following streams flow into Chesapeake bay: the Potomac, the largest tributary of which is the Shenandoah, and its chief smaller ones Potomac creek, Occoquan river, Broad run, Goose, Kittoctin, and Opequan creeks; the Rappahannock, with its Rapidan and numerous other branches; the Pianketank; the York, with its Pamunkey and Mattapony branches and many other tributaries; and the James, with its vast system of tributary rivers and streams, including the Chickahominy, Elizabeth, Nansemond, Appomattox, Rivanna, Willis's, Slate, Rockfish, Tye, Pedlar, South, Cowpasture, Jackson's, &c. The S. E. part of the state is drained by the Roanoke and its numerous affluents, of which the Dan and Staunton are the most important, and by the Blackwater, Nottoway, and Meherrin branches of the Chowan, a river of North Carolina. Both the Roanoke and Chowan discharge their waters into Albemarle sound. The sources of the Yadkin are in the Blue Ridge. The Great Kanawha or New river rises in North Carolina and flows N. E. through Virginia (where it receives numerous tributaries) and N. W. through West Virginia to the Ohio. The S. W. part of the state is drained by the forks of Holston and Clinch rivers and numerous tributary streams, which reach the Ohio through the Tennessee. In the mountain region in this part of the state rise the Louisa, Russell's, and Tug forks of the Big Sandy river, which empties into the Ohio.—A geological survey of Virginia was made in 1835-'40 by William B. Rogers, state geologist. The eastern portion of the state is composed wholly of tertiary sands, clays, and marls, the newer pliocene and deposits belonging to the present epoch being found along the borders of the Chesapeake and the Atlantic ocean; while further inland strata of the miocene group emerge from beneath these and abut against the highest platform of granite, gneiss, and other metamorphic rocks, the eastern margin of which is defined by a line connecting the lowest falls upon the principal rivers. These falls, which also limit the navigation of the streams in ascending from the sea, mark the sites of the principal cities, as Fredericksburg, Richmond, and Petersburg. From Petersburg the dividing line between the two formations extends S. S. W., leaving the state in the S. corner of Greenville co. The miocene strata abound in fossil shells, little altered in appearance from those of living beds along the coast, and furnish most valuable material for fertilizing the soil of this region. The metamorphic belt stretches westward over the summit of the Blue Ridge, and widens rapidly toward the south, reaching as far as Grayson and Carroll cos., on the line of North Carolina. This is the metalliferous belt of the state. The formation is similar to that traced through Massachusetts, Connecticut, New Jersey, Pennsylvania, and Maryland. One part of this crosses the James river a few miles above Richmond, and terminates a little S. of the Appomattox river on the eastern border of Amelia co. In it lie the coal mines of the James river, which are referred to the triassic and Jurassic period. The great valley of Virginia, W. of the Blue Ridge, extending through the western counties of Frederick, Shenandoah, Rockingham, Augusta, Rockbridge, Botetourt, Roanoke, Montgomery, Pulaski, Wythe, Smyth, and Washington, to the Tennessee line, consists chiefly of lower Silurian rocks, among which the limestones prevail, insuring a fertile soil. On the western borders of this valley the upper members of the Appalachian system of rocks are met with, sometimes, through the effect of great faults, abutting against the lower members of the group. In the North mountains on the W. side of the valley are fragments of the sub-carboniferous rocks, containing in places semi-anthracite coal, gypsum, and rock salt. Near these lines of fault are many mineral springs, some of which are celebrated for their medicinal effects. Among the most noted are the Buffalo Lithia in Mecklenburg co.; Orkney in Shenandoah; Rawley in Rockingham; Stribling and Variety in Augusta; Rockbridge Alum, Jordan Alum, Cold Sulphur, and Baths in Rockbridge; Bath Alum, Wallawatoola, Warm, Hot, and Healing in Bath; Sweet Chalybeate in Alleghany; Blue Ridge, Coyners, and Daggers in Botetourt; Alleghany, Montgomery White Sulphur, and Yellow Sulphur in Montgomery; and New River White Sulphur in Giles.—Virginia is rich in minerals, which are as yet mostly undeveloped. They comprise gold, iron, copper, lead, zinc, semi-bituminous and bituminous coal, granite, limestone, marble, freestone, greenstone, brown stone, brick and fire clays, glass sand, plumbago, manganese, gypsum, salt, &c. Gold is found in a belt from 15 to 25 m. wide and 200 m. long, extending from Washington to Halifax Court House. Numerous mines have been opened, especially in Fauquier, Culpeper, Spottsylvania, Orange, Fluvanna, and Buckingham cos. The value of gold from Virginia deposited at the mints and assay offices of the United States to June 30, 1875, was $1,635,-279. Silver is associated with some of the gold-bearing rocks of this region, especially the chloritic slate. A variety of iron ores abounds in every natural division of Virginia excepting the tidewater. The great iron belt, in which are found vast quantities of red and brown iron ores, is included in the Appalachian country. On the slopes of the Kittatinny mountains are found solid masses of brown hematite iron ore, extending to unknown depths and presenting the appearance of a thick stratum between the sandstone and limestone rocks that form the mountains. Among the foot hills at the W. base of the Blue Ridge are remarkable deposits of brown hematite or hydrated peroxide of iron, which extends nearly 300 m. The ore is of the best quality, and is found in beds which often extend unbroken for miles, with a thickness of from 10 to 100 ft. The manganese in some of the ores renders them valuable for the manufacture of Bessemer steel. Copper pyrites are abundant in the gold belt, where carbonate of copper is also found. Large quantities of the ore of sulphuret of copper are obtained in Louisa co. Copper, chiefly in the form of sulphurets, abounds throughout the Blue Ridge range. Mines have been worked in Floyd, Carroll, and Grayson cos. Some of the ores yield from 26 to 29 per cent. According to Prof. T. S. Hunt, "the mountains of the Blue Ridge contain deposits of sulphur ore as abundant as those of Spain." Lead abounds in many parts of the great valley; about 25,000,000 lbs. have been taken from the mines in Wythe co. since 1763. Zinc is found coextensive with the lead. Plumbago is found in Halifax, Amelia, and other counties. In middle Virginia are beds of bituminous coal covering an area estimated by Rogers at 185 sq. m. The Richmond coal field, about 13 m. W. of Richmond, in the counties of Chesterfield, Powhatan, Henrico, and Goochland, is about 30 m. long, with a maximum breadth of about 8 m. It has been longer known and worked than any other in the United States, but its importance has declined. Bituminous coal is also found in the S. W. part of the state, in the counties of Tazewell, Russell, Scott, Lee, Buchanan, and Wise, being a part of the great Appalachian coal field. Semi-anthracite or semi-bituminous coal occurs along the western side of the valley division of Virginia. The coal is used only for domestic purposes, but its proximity to extensive iron beds may render it useful for manufacturing purposes. Marls and other agricultural minerals are abundant in the tidewater country. A great variety and abundance of building stones are found in nearly all parts of the state. Beds of gypsum of superior quality have been opened for more than 20 m. along the North fork of Holston river, in Washington and Smyth cos. In the same region salt is obtained from artesian wells about 200 ft. deep, the water rising to within 40 ft. of the surface. The brine comes from a solid bed of salt. The annual production of salt is about 350,000 bushels. Salt has also been made in the S. E. part of Lee co., on the Clinch river.—Virginia abounds in natural curiosities of great interest. The natural bridge in Rockbridge co. is one of the most remarkable natural arches in the world. (See Bridge, Natural.) Weyer's cave, in the N. E. corner of Augusta co., ranks among the stalactite caverns of the United States next to the Mammoth cave of Kentucky and Wyandotte cave in Indiana. Madison's cave, near it, about 300 ft. in diameter, has two extensive basins of very clear water, and from the vaulted arches depend great numbers of brilliant stalactites. The Blowing cave, near Millborough, between the Rockbridge and Bath Alum springs, during the hot weather emits a current of cold air with such force as to prostrate the weeds at the entrance; and during the winter a current of the cold air from without rushes into the cave. There is a flowing and ebbing spring near this cave, and there is also one in Brocks's gap in Rockingham co., and another near the mouth of the North Holston in the S. W. part of the state, which Jefferson regarded as syphon fountains. The numerous mineral springs are for the most part in valleys surrounded by exquisite natural scenery.—The climate varies greatly in different districts. In the E. and S. E. parts of the state the summers are hot, and in the vicinity of swampy lands near the coast intermittent fever is common. The region lying on and near Hampton roads is however healthful and agreeable at all seasons of the year. The peninsular district between the James and York rivers, and between the latter and the Potomac, is specially subject to miasmatic influences during the summer and early autumn months; in winter it is more healthful. The valley of Virginia has a salubrious and delightful climate, the summer heats being tempered by the elevation and the cool breezes, while it is sheltered by the mountains from the intense cold of winter. The mountainous district generally has a very agreeable climate in summer, but portions of it are very cold in winter. In general the climate is mild, dry, and healthful. The length of the growing season, the distribution of rain throughout the year, and the short and mild winters, are highly favorable to agriculture. The following statement shows the results of meteorological observations at Norfolk, lat. 36° 51′; Lynchburg, lat. 37° 23′; and Wytheville, lat. 36° 56′:

PARTICULARS.	Norfolk.	Lynchburg.	Wytheville.
Spring, mean temperature.	55·1°	51·5°	50·2°
Summer, " "	76°	75·8°	68·8°
Autumn, " "	58·4°	55°	....
Winter, " "	44·3°	40·5°	....
Year, " "	58·4°	56·5°	51·3°
Mean annual barometer....	30·08	30·07	29·86
Annual rainfall, inches.....	55·27	44·74	40·66

—The soil of the tidewater region is a light sandy loam, capable of yielding large crops of fruit and esculent vegetables; but it has been to a great extent worn out by superficial cultivation without manure, and many estates, once among the finest in the state, have been given up to dwarf pines and cedars. The free use of gypsum and marl, both found in great quantities in the state, is sufficient in two or three years to restore these lands to a condition of high productiveness. In the vicinity of the Roanoke, the James, and their tributaries, large quantities of tobacco are raised. The valley has a rich soil, admirably adapted to the cultivation of cereals, and is in fact the granary of the state. Much of the mountainous region is uncultivated, and some of it incapable of tillage; but the valleys between the parallel ridges are generally well watered, and yield liberal crops if properly tilled. The forest wealth of Virginia is very great; in 1870 the products were valued at $686,862. In the tidewater section are extensive forests of pine (the noted yellow Virginia), oak, cypress, cedar, locust, &c., from which large quantities of timber and sawed lumber are obtained. Large areas of superior hard pine, black, white, and other oaks, hickory, locust, persimmon, gum, cedar, holly, and other trees are found in the middle region. The Piedmont division has considerable forest land, with oak of many varieties, hickory, tulip-poplar, black walnut, locust, cedar, chestnut, pine, &c. The Blue Ridge is mostly covered with forests of oak, hickory, chestnut, locust, birch, &c., with some excellent yellow pines. Large quantities of charcoal for the manufacture of iron are produced here. The valley has much superior hard-wood timber, especially oaks and hickories. In some parts of the Appalachian country are extensive forests of valuable timber, including oak, walnut, tulip-poplar, locust, sycamore (buttonwood), and pine. The trade in sumach from wild shrubs is growing in importance; and the gathering of bark for tanning and dyeing purposes is an important industry. —The great advantages of soil and climate give to Virginia valuable resources as an agricultural state. The annual production of cereals is large. One of the most important crops is tobacco, the "Virginia leaf" being widely known for its excellence. According to the census of 1870, Virginia produced 37,086,364 lbs. of tobacco, being more than in any other state except Kentucky. The nutritious grasses, including the noted blue grass, of the Piedmont, Blue Ridge, valley, and Appalachian sections, place these among the best grazing regions in the United States. The production of hay is important. Some cotton is produced in the tidewater country, and flax and hemp are grown, but not extensively. Every part of the state is well adapted to the growth of fruit. The Blue Ridge has superior advantages for the production of fruit and wine. The orchard products of the state in 1870 were valued at $891,231, and the produce of market gardens at $505,117. Large quantities of small fruits and garden produce are annually shipped from the tidewater region to Baltimore, Washington, Philadelphia, New York, and other points. The trade in strawberries is especially large. Near the sea wild Scuppernong grapes abound, and are used in the manufacture of a palatable wine. Large quantities of peanuts are raised in the tidewater region, and form a considerable item of commerce. Dairying and stock raising are important industries. According to the census of 1870, there were 3,073,257 acres of improved land in farms, 1,386,934 of woodland, and 68,613 of other unimproved land. The total number of farms was 73,849, containing an average of 246 acres each; 4,492 contained from 3 to 10 acres, 6,300 from 10 to 20, 16,891 from 20 to 50, 17,208 from 50 to 100, 26,696 from 100 to 500, 1,808 from 500 to 1,000, and 317 over 1,000. The cash value of farms was $213,120,845, and of farming implements and machinery $4,924,036. The chief crops as reported by the United States department of agriculture in 1873 were as follows:

PRODUCTS.	Quantity produced.	No. of acres in each crop.	Average yield per acre.	Total value.
Indian corn, bush.	19,275,000	1,014,474	19	$11,372,250
Wheat..........	5,788,000	771,733	7·5	8,392,600
Rye............	465,000	47,938	9·7	362,700
Oats............	5,397,000	331,104	16·3	2,374,680
Barley..........	7,000	378	18·5	4,900
Buckwheat......	40,000	2,234	17·9	28,000
Potatoes.........	1,242,000	17,743	70	881,820
Tobacco, lbs......	50,000,000	82,200	608	4,600,000
Hay, tons........	160,000	160,000	1	2,752,000
Total........	....	2,427,804	......	$30,768,950

The number and value of farm animals were:

ANIMALS.	Number.	Value.
Horses..........................	189,300	$14,371,656
Mules..........................	29,600	3,073,368
Oxen and other cattle............	405,700	6,978,040
Milch cows......................	234,000	5,148,000
Sheep..........................	367,500	1,065,750
Hogs	753,100	2,643,381

According to the census of 1870, the state produced 7,398,787 bushels of wheat, 582,264 of rye, 17,649,304 of Indian corn, 6,857,555 of oats, 7,259 of barley, 45,075 of buckwheat, 1,293,853 of Irish and 865,882 of sweet potatoes, 877,110 lbs. of wool, 6,979,269 of butter, 10,999 of hops, 245,093 of maple sugar, 505,239 of honey, 329,155 gallons of sorghum molasses, and 11,400 of maple molasses.—The tidal waters of Virginia abound in shad, herring, rock, perch, sturgeon, bass, trout, Spanish mackerel, and other fish, besides crabs, lobsters, terrapins, &c. Not less than $1,000,000 worth of these fish are annually sent to northern markets. Oysters abound in the tributaries of Chesapeake bay and along the Atlantic coast. It is estimated that more than 15,000,000 bushels of oysters, valued at from $12,000,000 to $15,000,000, are taken from these tide-water beds. Pursuant to the act of 1875, three fish commissioners have been appointed for the promotion of pisciculture in the state.—The great variety and abundance of raw materials, the ample supply of water power, and the convenience and extent of transportation facilities, give to Virginia marked advantages as a manufacturing state. The total number of manufacturing establishments in 1870 was 5,933, having 396 steam engines of 8,410 horse power, and 2,229 water wheels of 41,202 horse power, and employing 26,974 hands, of whom 22,175 were males above 16 years of age, 2,259 females above 15, and 2,540 youth. The amount of capital employed was $18,455,400; wages paid during the year, $5,343,099; value of materials used, $23,832,384; of products, $38,364,322. The leading industries were as follows:

INDUSTRIES.	No. of establishments.	Hands employed.	Capital.	Value of products.
Agricultural implements..	37	267	$187,128	$403,457
Blacksmithing	825	1,435	189,498	729,128
Boots and shoes..........	498	850	160,876	638,534
Bakery products	43	163	58,675	308,264
Carpentering and building	319	915	174,747	1,020,930
Carriages and wagons....	186	563	157,565	389,663
Cars, freight and passenger	7	469	1,205,600	613,036
Clothing, men's	95	278	60,905	290,384
" women's........	51	103	19,240	105,737
Cotton goods, not specified	11	1,741	1,128,000	1,435,800
Fertilizers...............	7	42	72,000	130,505
Flouring and grist-mill products...............	1,556	2,592	5,324,846	12,649,276
Furniture................	126	311	132,942	280,832
Iron, blooms..............	5	141	125,530	222,700
" forged and rolled....	12	696	810,200	1,994,146
" nails and spikes.....	1	160	125,000	350,000
" pigs................	18	1,036	828,700	619,820
" castings............	54	541	554,235	769,274
Leather, tanned..........	172	313	211,790	462,149
" curried..........	146	194	90,694	328,294
Liquors, distilled.........	49	140	238,635	415,990
" malt.............	6	32	286,900	83,830
Lumber, sawed	605	2,283	979,386	2,111,055
Machinery................	28	523	714,727	591,172
Paper	4	77	401,000	244,268
Saddlery and harness.....	123	245	90,690	231,231
Sash, doors, and blinds....	17	143	107,672	154,508
Sumach, ground	12	61	126,450	221,230
Tin, copper, and sheet-iron ware	80	251	120,357	296,998
Tobacco, chewing, smoking, and snuffing......	94	7,414	1,361,700	6,985,249
Tobacco, cigars...........	35	114	29,425	114,191
Wool-carding and cloth-dressing...............	50	76	44,875	136,123
Woollen goods...........	19	203	391,500	852,829

Besides the above, the products of mines and quarries amounted to $409,914, including bituminous coal valued at $226,114; copper, $8,000; gold quartz, $31,000; iron ore, $23,000; lead, $23,000; slate, $42,800; stone, $51,000; and zinc, $5,000. The amount of capital invested in mining was $1,113,000, of which $779,200 was in the coal industry. The pig iron made in Virginia in 1874 was valued at $29,451.—Chesapeake bay, the great rivers that empty into it and into the Atlantic, the numerous navigable bays, commodious harbors, roads, inlets, &c., along the eastern border of the state, give to Virginia rare commercial facilities. Large ships enter the interior of the state through rivers and other navigable waters. The Potomac is navigable for about 120 m. from where it enters the bay, 75 m. from the ocean. Steamers and sailing vessels ascend the Rappahannock to Fredericksburg, about 100 m. from its mouth at the bay. Vessels drawing 11½ ft. go to Tappahannock, the port of entry for the river. The Pianketank is navigable for about 14 m.; Mobjack bay and its rivers afford entrances to the Gloucester peninsula. York river from the bay to Yorktown, about 13 m. distant, affords an excellent harbor. Ships drawing 27 ft. go nearly to West Point at the head of the river and about 40 m. from the bay. The Mattapony and the Pamunkey, which unite to form the York, are navigable, the former for 30 m. and the latter for 35 m. from West Point. The James is navigable for vessels drawing 14 ft. to Richmond, nearly 150 m. from the bay, and for those drawing 15 ft. to the mouth of the Appomattox, about 60 m. below Richmond. The Appomattox is navigable for about 12 m. to Petersburg, a port of entry. The Chickahominy and Nansemond, tributaries of the James, are also navigable for short distances. Hampton roads, the broad estuary of James river, is one of the best harbors on the Atlantic coast. The Elizabeth river is a broad arm of Hampton roads, extending for 12 m., and affording the magnificent harbor between Norfolk and Portsmouth and Gosport, which is connected with the navigable sounds and rivers of North Carolina by ship canals. The foreign commerce of Virginia consists chiefly in the export of raw materials, most of the foreign imports brought to the state being entered at northern ports. Norfolk and Portsmouth are important points for the shipment of cotton. Virginia contains seven United States customs districts, which, with their foreign commerce and the number and tonnage of vessels registered, enrolled, and licensed, for the year ending June 30, 1875, are as follows:

DISTRICTS.	Imports.	Exports.	REGISTERED, &C.	
			Vessels.	Tons.
Alexandria.........	$8,060	....	93	3,198·79
Cherrystone........	......	....	363	5,925·83
Norfolk and Portsmouth	18,929	$5,243,986	380	13,977·24
Petersburg.........	26,188	699	6	62·09
Richmond	433,905	2,944,642	38	4,615·01
Tappahannock.....	......	....	78	1,808·83
Yorktown.........	......	....	114	2,288·76
Total..........	$487,082	$8,189,327	1,072	31,876·05

The ports of entry have the same names as the districts, except that Crisfield is the port of entry in the Cherrystone district. The leading exports are tobacco, naval stores, cotton, and lumber. The entrances and clearances were:

DISTRICTS.	ENTERED.		CLEARED.	
	Vessels.	Tons.	Vessels.	Tons.
FOREIGN PORTS.				
Alexandria..................	17	5,445	......	....
Norfolk and Portsmouth....	24	13,299	106	49,332
Petersburg..................	11	2,443	1	282
Richmond...................	44	10,775	103	29,144
Total...................	96	31,962	210	78,758
COASTWISE.				
Alexandria	190	87,078	182	85,954
Cherrystone.................	......	....	......	....
Norfolk and Portsmouth....	1,152	1,041,901	1,067	1,002,896
Petersburg..................	443	448,089	428	437,274
Richmond	661	536,409	574	515,976
Tappahannock	122	94,643	118	93,573
Yorktown..................	213	206,443	213	206,443
Total...................	2,781	2,414,563	2,582	2,342,116

The total number of vessels built in the state was 45, of 1,473 tons.—In 1876 there was 1,616 m. of railroad in Virginia. The lines wholly or partly within the state, with their termini, total length, and mileage in Virginia, were:

NAMES OF CORPORATIONS.	TERMINI.		LENGTH.	
	From	To	Total.	In Virginia.
Alexandria and Fredericksburg	Alexandria	Quantico	27	27
Alexandria and Washington	Alexandria	Washington, D. C	7	7
Atlantic, Mississippi, and Ohio	Norfolk	Bristol, Tenn	408	408
Branches	Petersburg	City Point	10	10
	Glade Spring	Saltville	10	10
Chesapeake and Ohio	Richmond	Huntington, W. Va	421	222
Fredericksburg and Gordonsville *	Fredericksburg	Gordonsville	20	20
Petersburg	Petersburg	Weldon, N. C	63	46
Branch	Hicksford	Gaston, N. C	21	16
Richmond and Danville	Richmond	Greensboro, N. C	189	143
Leased, Roanoke Valley *	Keysville	Clarksville	31	31
Richmond and Petersburg	Richmond	Petersburg	22	22
Branch	Osborne's	Clover Hill	20	20
Richmond, Fredericksburg, and Potomac	Richmond	Quantico	82	82
Richmond, York River, and Chesapeake	Richmond	West Point	38	88
Seaboard and Roanoke	Portsmouth	Weldon, N. C	80	60
Valley (operated by Baltimore and Ohio)	Harper's Ferry, W. Va.	Staunton	...	104
Washington and Ohio	Alexandria	Snickersville	58	58
Washington, Virginia Midland, and Great Southern.	Alexandria	Danville	221†	221
Manassas division	Manassas	Strasburg	62	62
Branch	Warrenton Junction	Warrenton	9	9

The canals of Virginia are the James River and Kanawha, extending from Richmond to Buchanan, 198 m., with its North River branch to Lexington, 20 m.; the Dismal Swamp and branches, 33 m., which lie partly in North Carolina and afford communication between Albemarle sound and Chesapeake bay; the Alexandria and Georgetown, 7 m.; and the Albemarle and Chesapeake, 8½ m.—At the close of 1875 there were in the state 19 national banks, with a paid-in capital of $3,594,200; circulation outstanding, $3,286,662.—The constitution gives the right of voting to every male citizen of the United States, 21 years old, who has resided in the state for one year, and in the county, city, or town in which he offers to vote three months next preceding any election. Idiots and lunatics, persons convicted of bribery in any election, embezzlement of public funds, treason, or felony, and persons engaging as principals or seconds in a duel, are disqualified from voting. Persons entitled to vote and hold office, and none others, may sit as jurors. The chief executive power is vested in a governor, who is elected by the people for four years, and is ineligible for a second successive term. He receives an annual salary of $5,000. The next election for governor will occur in 1877. The lieutenant governor is elected at the same time and for the same term as the governor. He is president of the senate, and receives $10 a day during the session. The secretary of the commonwealth ($2,500), treasurer ($2,000), and auditor of public accounts ($3,000) are elected for two years by joint vote of the general assembly. The legislature (general assembly) consists of a senate of 43 members and a house of 138 delegates. Senators are elected for four and delegates for two years. They receive $6 per day of service and mileage. The general assembly meets annually on the first Monday of December; its sessions are limited to 90 days, but may be extended not more than 30 days by the concurrence of three fifths of the members elected to each house. It is believed that the pending constitutional amendment for biennial sessions will be ratified by the people. The judiciary comprises a supreme court of appeals, circuit courts, and county courts. The supreme court of appeals consists of five judges, who are chosen for 12 years by joint vote of the general assembly, and receive an annual salary of $3,000 each except the chief, whose salary is $3,200. It has appellate jurisdiction only except in cases of habeas corpus, mandamus, and prohibition. Except in certain specified matters, it does not have jurisdiction in civil cases when the amount in controversy, exclusive of costs, is less than $500. Annual sessions are held in Richmond, Staunton, and Wytheville. The state is divided into 16 judicial circuits, in each of which a judge is elected for eight years by joint vote of the legislature. A circuit court is held at least twice a year in each county. Circuit courts have jurisdiction in all cases in chancery and all actions at law where more than $50 is involved; also appellate jurisdiction over cases in the county courts. County courts are held every month. The judges are chosen for six years by joint vote of the general assembly. There are also elected in the same manner and for the same term, for each city or town in the state containing a population of 5,000, one city judge, who holds a corporation or hustings court with the same jurisdiction as that exercised by circuit courts. An attorney general of the commonwealth is elected by the people for four years. United States courts are held twice a year at Richmond, Alexandria, and Norfolk in the eastern district, and at Danville, Lynchburg, Harrisonburg, and Abingdon in the western district. The constitution provides for the establishment of a bureau of agriculture and immigration, and for a board of public works, to consist of the governor,

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* Partly completed.

† The entire distance is 243 m., but 22 m. belong to the Chesapeake and Ohio railroad company.

auditor, and treasurer. A board of immigration is now in operation. The general assembly is required to provide for the annual registration of births, marriages, and deaths. The constitution requires taxation to be uniform and equal, and forbids any species of property from which a tax may be collected to be taxed higher than any other species of property of equal value. The legislature may exempt all property used exclusively for state, county, municipal, benevolent, charitable, educational, and religious purposes. The credit of the state may not be granted to or in aid of any person, association, or corporation. The legal rate of interest is 6 per cent. The constitution provides that in 1888 and every 20th year thereafter the question whether it shall be amended shall be submitted to the people. Virginia is represented in congress by two senators and nine representatives, and has therefore eleven votes in the electoral college.—The total debt of Virginia on Oct. 1, 1875, including unpaid interest amounting to $2,781,030, was $32,295,456, consisting of bonds with tax-receivable coupons attached amounting to $18,881,500; registered bonds, convertible into tax-receivable bonds, $1,355,516; and bonds not so convertible, $9,277,410. The annual interest on the debt proper amounts to $1,752,682; due the literary fund, $83,907; payable by law to the sinking fund, $198,447; total, $2,035,036. The amount of interest paid in 1875 was $1,417,345, showing a deficiency of $617,691. The above does not include one third (about $15,000,000) of the former debt of Virginia for which it is claimed West Virginia is liable. The receipts and expenditures of the government for a series of years have been:

FISCAL YEAR.	Total receipts.	EXPENSES OF THE GOVERNMENT.		Paid to free school fund.	Paid on interest on the debt.
		Ordinary.	Extra-ordinary.		
1869-'70	$1,487,353	$1,041,682	$17,933	....	$346,034
1870-'71	2,732,456	1,243,682	129,548	$382,000	99,980
1871-'72	2,160,593	1,098,808	40,026	385,994	639,114
1872-'73	2,421,945	1,082,536	13,885	375,000	1,290,758
1873-'74	2,578,938	1,057,975	55,407	345,000	1,691,191
1874-'75	2,647,790	980,450	28,177	423,000	1,417,345

According to the federal census of 1870, the true value of real and personal estate was $409,588,133; the assessed value was $365,439,917, including $279,116,017 of real and $86,323,900 of personal estate. The value of property as assessed with taxes by the state authorities for three years has been as follows:

PROPERTY.	1873.	1874.	1875.
Real.........	$251,573,611	$253,486,058	$256,221,212
Personal.....	85,112,800	78,942,198	80,263,254
Total......	$336,686,411	$332,428,256	$336,484,466

The apparent decrease in the assessed value of personal property in 1874 and 1875 is due to a change in the mode of assessing license taxes. The total tax in 1875 was $2,465,930, including the capitation tax of $264,206 ($163,020 from white and $101,186 from colored persons), arising from $1 levied on each adult male; personal property, $401,316, being 50 cts. on each $100 value of personal property ($357,301), and 1 per cent. on annual incomes exceeding $600 ($44,015); real estate, $1,281,106; and licenses, $519,307.—The state penitentiary is in Richmond. The total number of prisoners on Sept. 30, 1875, was 942, of whom all but 182 were colored. Of this number, 575 were in the prison and 367 were employed under contract outside. The chief industries carried on in the prison are shoemaking, blacksmithing, weaving, coopering, and carpentering. In 1875 the earnings of the 219 convicts engaged in manufactures in the penitentiary were about $20,000, in addition to which nearly $30,000 was received from the hire of convicts. The expenses of the penitentiary during the year were $77,779. Virginia has three state asylums for the insane. The eastern asylum, at Williamsburg, established in 1773, is the oldest institution of the kind in the United States. The total number of inmates during the year ending Sept. 30, 1875, was 366; average number, 302; present at close of the year, 305, of whom only 8 paid in full and 5 in part for their support. The ordinary expenditures of the institution during the year amounted to $64,094; the receipts on account of general support were $65,932, including $60,000 from the state and $5,260 from patients. The western lunatic asylum, at Staunton, was opened in 1828, and during the two years ending Sept. 30, 1875, had 469 patients; 356 were inmates at that date, of whom 332 were regarded as incurable. The receipts during the two years amounted to $142,957, including $120,000 from the state and $20,414 from patients; expenditures, $145,218. The central lunatic asylum, in Richmond, was established in 1870 for the colored insane. The total number of inmates during the year ending Sept. 30, 1875, was 287; average number, 238; remaining at the close of the year, 243. The cost of supporting the institution during the year was $46,682, exclusive of $5,245 spent for permanent improvements and supplies on hand. The state appropriation was $50,000. The accommodations of these three institutions are inadequate for the treatment of the insane of the state, many of whom are confined in county jails. The state institution for the deaf and dumb and the blind is at Staunton, and was opened in 1839. Children of the state unable to pay are educated and clothed free of charge; others are required to pay $200 a year for board and tuition. Besides the ordinary studies, pupils are taught industrial branches. During the year ending June 30, 1875, 100 deaf mutes and 42 blind pupils were receiving instruction. The ordinary expenditures amounted to $34,765, and the total to $47,787. The income included $40,000 from the state,

$1,065 from pupils, and $627 from shops, sales, &c.—The general supervision of education is vested in a superintendent of public instruction, who is elected for four years by joint ballot of the general assembly, and receives an annual salary of $2,000. The board of education, consisting of the governor, superintendent of public instruction, and attorney general, is empowered to appoint and to remove district trustees, and, with the senate's approval, county superintendents; also to provide for uniformity of text books. It has the management and investment of all school funds. The school funds comprise the annual interest on the literary fund, a capitation tax of $1 on each adult male citizen, and an annual tax upon the property of the state of not less than one nor more than five mills on the dollar. Each county and public free school district may raise additional sums by a tax not exceeding five mills on property for the support of public free schools. Substantial aid, amounting in 1875 to $23,750, is received from the Peabody educational fund. The most important school statistics for the year ending July 31, 1875, were as follows:

PARTICULARS.	White.	Colored.	Total.
School population (5 to 21)	280,149	202,640	482,789
Percentage enrolled	46·2	27·1	38·2
“ in average daily attendance	19	14·5	17
“ of attendance on average enrolment	76	73·5	75·3
Number of public schools	3,121	1,064	4,185
“ of county superintendents	......	......	89
“ of school districts in cities and counties	......	......	458
Average number of months taught	......	......	5·59
Number of graded schools (included in above)	108	47	155
“ of pupils enrolled	129,545	54,941	184,486
Average daily attendance	74,056	29,871	103,927
Number of teachers	3,723	539	4,262
Average monthly wages	......	......	$30 48
Value of school property	......	......	$757,181
Current school expenditures	......	......	$924,118
Permanent improvements	......	......	$97,278
Aggregate expenditures for school purposes	......	......	$1,021,396
Received from state funds	......	......	$478,750
“ “ local taxation	......	......	$465,414
“ “ Peabody fund and private gifts	......	......	$77,232
Number of pupils in private schools	19,466	3,819	23,285
“ “ in colleges	1,880	......	1,880
“ of teachers in private schools	1,229	90	1,319
Whole number of pupils in school	149,011	58,760	[*] 207,771
“ “ of teachers	4,952	629	5,581

The constitution of 1870 requires the general assembly to establish normal schools "as soon as practicable." As yet (1876) no provision has been made by the state for the normal training of white teachers, but there are two excellent normal schools for colored teachers, at Hampton and Richmond. In 1875–'6 there were in the former 17 instructors and 212 students. (See HAMPTON.) The Richmond normal school was opened in 1867, and in 1875–'6 had 6 instructors and 109 pupils. It is not a state institution. Teachers' institutes are held in most of the counties.—The Virginia agricultural and mechanical college was opened at Blacksburg, Montgomery co., in October, 1872. It has received two thirds ($270,000) of Virginia's share of the proceeds of the land grant made by congress in 1862. The general assembly has also appropriated $15,000 per annum for three years for the erection of buildings. The act of the general assembly establishing the college provides that a number of students equal to the number of members of the house of delegates, to be apportioned in the same manner, shall have the privilege of attending the college without charge for tuition. Other students are required to pay $40 a year for tuition. The course of study comprises three years, upon the completion of which, and after examination, the degrees of graduate in agriculture and graduate in mechanics are conferred. There is a well equipped farm of 325 acres, and a large workshop supplied with steam power. Military instruction is afforded throughout the course. In 1874–'5 there were 7 instructors and 222 students. The Virginia military institute, at Lexington, was opened in 1839, and in 1875–'6 had 20 instructors and 248 students. It receives an annual appropriation of $15,000 from the state, in consideration of which board and tuition are given free to 50 state students. The plan of instruction and government is founded upon that of the military academy at West Point. The course of instruction, in which scientific branches, and the Latin, French, and German languages, are prominent studies, occupies four years. Special courses are provided for post-graduate students. Emory and Henry college (Methodist Episcopal church, South), in Washington co., was opened in 1838, and in 1875–'6 had 7 instructors and 171 students, of whom 152 were in the collegiate department. It receives annually 16 students free of charge for tuition, in consideration of a grant made to it by the state. Hampden Sidney college (Presbyterian), in Prince Edward co., was established in 1776, and in 1875–'6 had 5 instructors and 77 students. Randolph Macon college (Methodist), at Ashland, opened in 1832 in Mecklenburg co., had in 1875–'6 167 students. Richmond college (Baptist), in Richmond, has been in existence since 1840, and in 1875–'6 had 7 instructors and 148 students. Roanoke college (Lutheran), at Salem, was established in 1852, and in 1875–'6 had 9 instructors and 171 students, of whom 123 were in the collegiate and 48 in the preparatory department. (See VIRGINIA, UNIVERSITY OF, WASHINGTON AND LEE UNIVERSITY, and WILLIAM AND MARY, COLLEGE OF.) Prominent among the institutions for the superior instruction of women are the Martha Washington college at Abingdon, Hollins institute at Botetourt Springs, Roanoke female college at Danville, Farmville female college, Petersburg female college and southern female college in Petersburg, Richmond female institute, and Augusta female seminary, Staunton female seminary, Virginia female institute, and Wesleyan female institute, in Staunton. Instruction in science is afforded by the Hampton normal and agricultural institute, the Virginia agricultural and mechanical college, the Virginia military institute, and the scientific departments of the university of Virginia and Washington and Lee university; in law by the law departments of Richmond college, the university of Virginia, and Washington and Lee university; and in medicine by the medical department of the university of Virginia and the medical college of Virginia. The last named institution, established in 1851, is in Richmond. The Protestant Episcopal theological seminary, near Alexandria, opened in 1823 and chartered in 1854, has a course of study occupying three years and a preparatory department. In 1875–'6 there were besides the president 3 professors and 40 students in the seminary, and 2 instructors and 11 pupils in the preparatory department. The library contains 10,000 volumes. The theological seminary of the general synod of the Evangelical Lutheran church in North America, established at Lexington, S. C., in 1831, was removed to Salem, Roanoke co., Va., in 1872; and in 1875–'6 there were 3 professors and 11 students. The union theological seminary of the general assembly of the Presbyterian church, established in 1824, is at Hampden Sidney in Prince Edward co. The course of instruction occupies three years. In 1875–'6 there were 4 instructors and 74 students. St. John's theological seminary (Roman Catholic) is in Norfolk.—According to the census of 1870, the total number of libraries in the state was 4,171, having 1,107,313 volumes. Of these, 2,762 with 721,203 volumes were private, and 1,409 with 386,020 volumes other than private, including two state libraries with 22,700 volumes; 12 court and law, 2,117; 4 school and college, 50,000; 1,146 Sabbath school, 182,436; 232 church, 75,233; and 12 circulating, 52,781. In 1876 the state library in Richmond had 30,000 volumes, and that of the university of Virginia 36,000. In 1870 there were published in the state 114 newspapers and periodicals, with an aggregate circulation of 143,840, and issuing annually 13,319,578 copies. Of these, 16 were daily, with a circulation of 24,099; 7 tri-weekly, 4,800; 8 semi-weekly, 7,033; 69 weekly, 75,488; 4 semi-monthly, 4,520; and 10 monthly, 27,900. The total number in 1875 was 142, including 21 daily, 4 tri-weekly, 9 semi-weekly, 92 weekly, 5 semi-monthly, and 11 monthly.—The total number of religious organizations in 1870 was 2,582, having 2,405 edifices with 765,127 sittings, and property valued at $5,277,368. The denominations were as follows:

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[*] Not including those in colleges or those over 21 years of age.

DENOMINATIONS.	Organizations.	Edifices.	Sittings.	Property.
Baptist, regular	795	749	240,075	$1,279,048
" other	54	44	16,755	66,000
Christian	100	88	29,225	92.170
Episcopal, Protestant	185	177	60,105	843,210
Friends	12	13	4,925	35,625
Jewish	8	7	1,890	35,300
Lutheran	80	73	25,350	160,800
Methodist	1,011	901	270,617	1,449.565
Moravian (Unitas Fratrum)	1	1	350	1,500
New Jerusalem (Swedenborgian)	3	3	550	2.200
Presbyterian, regular	204	200	70,065	837,450
Reformed church in America (late Dutch Reformed)	1	1	100	350
Reformed church in the United States (late German Reformed)	24	16	5,900	38,500
Roman Catholic	19	17	9,800	343,750
United brethren in Christ	42	30	7,700	23,300
Unknown (local mission)	1	1	150	6.000
Unknown (union)	42	84	21,570	62.600

The name Virginia was given by Queen Elizabeth to the region (now North Carolina) discovered in 1584 by persons sent out by Raleigh. All the country from lat. 34° to 45° N. was afterward known as Virginia, being divided into the first or southern, and the second or northern colony; the latter was subsequently called New England. In 1606 James I. granted to the London company the exclusive right to the territory from lat. 34° to 38° N., and extending into the interior 100 m. from the sea coast. The country from 41° to 45° N. was granted to another company, while the intermediate district from 38° to 41° was left open to the competition of both. The 105 colonists sent out by the London company founded Jamestown on the N. bank of James river, May 13, 1607, which was the first permanent settlement by the English in America. The three ships were under the command of Christopher Newport, and the expedition was accompanied by Bartholomew Gosnold, John Smith, Edward Maria Wingfield, a merchant, and the Rev. Robert Hunt. The colony met with reverses, and was only saved from a disastrous end by Capt. John Smith. (See SMITH, JOHN.) In 1609 the London company was reorganized, and received a grant of territory extending 200 m. N. and the same distance S. of Old Point Comfort, and westward to the Pacific. The governing council was superseded by a governor to be appointed by the company's council in England, which was also empowered to make laws for the colony. Under this new charter Lord Delaware was appointed governor, Sir Thomas Gates lieutenant governor, Sir George Somers admiral, Christopher Newport vice admiral, and Sir Thomas Dale high marshal, all for life. Nine vessels with 500 colonists, including 20 women and children, set sail at once. Gates, Somers, and Newport accompanied the fleet, but the governor was detained for some time in England. The three officers all embarked in the same vessel, and were cast ashore on one of the Bermudas; one of the other vessels was lost, but the remaining seven arrived in safety in the James river. The old government was abrogated, but none of the officers of the new one having arrived, Smith retained the government, as the charter authorized him to do. He was soon after severely wounded by an accident and returned to England for surgical aid, leaving a colony of 500 persons, whose number in six months was reduced to 60. At this juncture Newport, Gates, and Somers, with 150 men, arrived from the Bermudas. In June, 1610, Lord Delaware with three ships arrived from England, bringing supplies and colonists. He took measures for procuring supplies, and established a trading post at Hampton. But he was soon superseded by Sir Thomas Dale, who arrived with 300 settlers and some cattle. Dale was succeeded in August, 1611, by Sir Thomas Gates, who brought 350 more colonists. New settlements were commenced at Henrico (now Dutch Gap), above Jamestown, and at the junction of the Appomattox and the James (now Bermuda Hundred). In 1616 Dale, who had resumed the government of the colony at the departure of Gates, returned to England, and soon after Capt. Argall was appointed deputy governor. He used his office so much to the distress of the colonists that Lord Delaware sailed from England to resume his duties, but died on his passage at the mouth of the bay which bears his name. In 1619 George Yeardley was appointed governor. At his summons delegates from each of the 11 plantations in Virginia assembled at Jamestown, July 30, 1619, which was the first elective body ever convened in the western world. During this year 1,200 colonists were sent over, among whom were 90 respectable young women, who were disposed of to the planters as wives at the cost of their passage. The culture of tobacco was already becoming profitable. Among the new colonists were 100 sent by the king's special order from the prisons, to be sold as servants to the planters. This was the first instance in which felons had been sent to a British colony, and despite the protests of the colonists they continued to be sent to Virginia for 100 years. In the same year a Dutch man-of-war brought to Jamestown 20 negroes, who were sold as slaves for life. This was the introduction of slavery. The number did not much increase for the next 40 years, being limited to a few cargoes brought in by Dutch traders. On July 24, 1621, an ordinance was passed creating a written constitution for the colony, which secured representative government and trial by jury. The constitution provided for a governor and council to be appointed by the company, and an annual general assembly composed of the members of the council and two burgesses chosen by the people of each plantation. The assembly was clothed with full legislative authority, its acts being subject to the governor's veto. More settlers arriving, new plantations were established on the York, James, and Potomac rivers, and on the eastern shore of Chesapeake bay. In 1622 occurred a bloody war between the colonists and the Indian tribes led by Opechancanough, the brother and successor of Powhatan. On the night of March 22 the Indians made a preconcerted attack on the white settlers scattered through distant villages, for 140 m. on both sides of James river, and massacred 347 men, women, and children. Of the total number of immigrants, exceeding 4,000, there remained a year after the massacre but 2,500 men. In 1624 the London company was dissolved by writ of *quo warranto*, after expending £150,000 beyond its receipts from the colony, which was thenceforward under the direct charge of the crown, except during the period of the commonwealth, 1649–'60. Its condition at this time was not prosperous, tobacco being the only article of export which paid a profit. In 1632 the laws of the colony were revised and consolidated. "A Perfect Description of Virginia" (London, 1649) gives the number of inhabitants at 15,000 English and 300 negro servants. In 1641 Sir William Berkeley became governor, and being a stanch loyalist soon came into collision with the parliament. The colony remained firm in its adherence to the Stuarts till March, 1651, when an English fleet, accompanied by commissioners of the council of state for the commonwealth of England, visited the Chesapeake, and arranged terms of capitulation with the loyalists; and Berkeley's commission being declared void, Richard Bennet, one of the commissioners of parliament, was in April, 1652, elected governor. On the restoration of Charles II. Sir William Berkeley was elected governor by the Virginia assembly and commissioned by the king. The code of the colony was again revised in 1661–'2, and the church of England reëstablished, and severe laws were passed against "nonconformists, Quakers, and Anabaptists." In 1671 the population was estimated by Sir William Berkeley at "40,000, including 2,000 black slaves and 6,000 Christian servants, of whom about 1,500 were imported yearly, principally English." The only exported commodity was tobacco, to the quantity of 15,000 or 20,000 hogsheads of 350 lbs. each. The Indians were completely subdued, so that there was no fear of them. There were 48 parishes, and the ministers were well paid. "But," adds the governor, "I thank God there are no free schools nor printing, and I hope we shall not have these hundred years; for learning has brought disobedience and heresy and sects into the world, and printing has divulged them, and libels against the best government. God keep us from both." The rapacity of the courtiers of Charles II., upon two of whom, Arlington and Culpeper, he had bestowed a patent of the Virginia colony, and the heavy taxation encouraged for his own purposes by Sir William Berkeley, and his inefficiency in repelling the Indians, led to great discontent, which in 1676, on the occasion of a levy of fresh taxes, culminated in "Bacon's rebellion." (See BACON, NATHANIEL.) Berkeley was succeeded by Lord Culpeper, and he by Lord Howard of Effingham. In 1699 an act was passed for founding Williamsburg and erecting a capitol; and in 1700 the general assembly was in session there. In 1705 the fifth colonial revision of the code was adopted. By it slaves were declared real estate, a provision which remained in force while Virginia continued a colony. In 1754 hostilities broke out with the French, who had built a line of military posts along the western slope of the Alleghanies and at the head waters of the Ohio, and in this war George Washington first entered the service of his country, commanding the colonial troops at the battle of Fort Necessity (1754), and being placed at the head of the Virginia forces after Braddock's defeat in 1755. The assertion by parliament in 1764 of the right to tax the colonies without their consent called forth an earnest petition, memorial, and remonstrance from the Virginia house of burgesses in December of that year; and the stamp, mutiny, and quartering acts passed by parliament in 1765 led to the adoption of resolutions, introduced by Patrick Henry, denying the right of any foreign body to levy taxes upon the colony. In the first colonial congress, which met in New York, Oct. 7, 1765, Virginia was not represented, her legislature having adjourned before the issuing of the Massachusetts circular; but its action was approved at the next session of the legislature. The commerce of Virginia with Great Britain was at this time larger than that of any other colony. In March, 1773, the house of burgesses appointed a committee "to obtain the most clear and authentic intelligence of all such acts of the parliament or ministry as might affect the rights of the colonies;" and the same committee were authorized to open a correspondence and communication with the other colonies. On the passing of these resolutions Lord Dunmore, the newly appointed governor, dissolved the assembly. In May, 1774, the burgesses protested against the act of parliament closing the port of Boston, when Lord Dunmore again dissolved the house. The Virginia convention which met at Richmond, March 20, 1775, to appoint delegates to the new continental congress, took measures for enrolling companies of volunteers in each county. Lord Dunmore proclaimed martial law Nov. 7, and on Nov. 23 with a British and tory force took possession of Norfolk. He soon retired, and was defeated at Great Bridge by the Virginia troops Dec. 9; but in January, 1776, he returned by sea with a larger force and bombarded Norfolk. He continued a predatory warfare along the whole Virginia coast through the ensuing summer, but was finally driven southward. The declaration of independence was proposed in the continental congress by the Virginia delegates under instructions from the convention of the colony. In the spring of 1779 the British made a descent upon the coast, destroyed Norfolk, took Portsmouth and Gosport, destroying the vessels of war building there, and burned or took 130 merchant vessels on the James and Elizabeth rivers. In January, 1781, Gen. Benedict Arnold entered and burned Richmond, then a village of 1,800 inhabitants. In the spring and early summer of the same year Cornwallis and Phillips plundered a great part of eastern Virginia. The surrender of Cornwallis at Yorktown, Oct. 19, 1781, virtually closed the war. Virginia had been the first to urge the organization of a confederacy of states; and when it became evident that this confederation was inadequate for the purposes of a national government, she was again the first to call a convention of the states, in September, 1786, to arrange for some additional compacts relative to a tariff, navigation, &c. This convention, delegates being in attendance only from five states, recommended the calling of a convention to assemble in the following May to consider the articles of confederation, and propose such changes therein as might render them adequate to the exigencies of the Union. The constitution framed by that convention was ratified by Virginia, June 25, 1788. The constitution of Virginia was framed in June, 1776, and in 1779 Richmond became the capital. In 1781 Virginia passed resolutions to cede, and in 1784 ceded to the United States her claims to lands N. W. of the Ohio, reserving to herself her lands S. of the Ohio, and bounty lands N. W. of that river for her revolutionary soldiers and those employed in the expedition for the conquest of Kaskaskia and Vincennes, and stipulating that the ceded lands should be erected into republican states not exceeding certain specified dimensions. Shortly afterward the territories now forming the state of Kentucky were detached from Virginia. (See KENTUCKY, vol. ix., p. 804.) For many years after the adoption of the federal constitution, Virginia maintained a predominant interest in the affairs of the nation. Of the first five presidents, four (Washington, Jefferson, Madison, and Monroe) were natives and residents of that state, each being reëlected; and three of the later occupants of the office (Harrison, Tyler, and Taylor) have been natives (one, Tyler, a resident) of it.—In 1859 Harper's Ferry in Virginia was the scene of the attempt to free the slaves made by John Brown and his followers. In the early part of 1861 public opinion was divided on the question of secession. On Jan. 7 the legislature met in extra session, and subsequently provided for the assembling of a convention to determine what course should be adopted by the state, and passed resolutions recommending the states to appoint commissioners to a national peace convention to be held in Washington in February, for the purpose of adjusting "the present unhappy controversies in the spirit in which the constitution was originally formed." The legislature also appointed ex-President John Tyler a commissioner to the president of the United States, and Judge John Robertson to South Carolina and "the other states that have seceded or shall secede, with instructions respectfully to request the president of the United States and the authorities of such states to agree to abstain, pending the proceedings contemplated by the action of this general assembly, from any and all acts calculated to produce a collision of arms between the states and the government of the United States." The reply of President Buchanan was that he had no power to make such agreement. In the mean time the legislature authorized the appropriation of $1,000,000 for the defence of the state. The state convention assembled in Richmond on Feb. 13, and was composed of 152 delegates, who had been elected on the 4th. A majority of these were "conditional" Union men, a few were in favor of immediate secession, and some were unconditional Unionists. On March 10 the committee on federal relations submitted a majority report, composed of 14 resolutions which condemned all interference with slavery, asserted the right of secession, and defined the circumstances under which Virginia would be justified in exercising that right, viz., the failure to procure such guarantees from the northern states as she demanded, the adoption of a warlike policy by the general government, or the attempt to exact payment of duties from the seceded states, or to reënforce or recapture the forts. These resolutions were discussed and adopted as far as the 13th, when the capture of Fort Sumter and the consequent proclamation of the president calling for troops led to the passing on April 17 of an ordinance of secession by a vote of 88 yeas to 55 nays. The people of the state had required that the action of the convention should be submitted to a popular vote. The election for this purpose was held on the fourth Thursday of May, when the secession ordinance was ratified by a majority of 96,750 in a total vote of 161,018. Immediately after the passing of the ordinance by the convention, the state authorities took possession of the custom house in Richmond, the navy yard at Norfolk, the United States arsenal at Harper's Ferry, and other federal property; troops were called out by Governor Letcher, and money was raised for arming and equipping them. On April 25 the convention passed an act for the adoption of the constitution of the provisional government of the Confederate States, having on the previous day entered into an agreement to place the military force of the state under the control of the president of the confederacy, and to turn over to the confederacy all the public property, munitions of war, &c., acquired from the United States. On May 7 the state was admitted to representation in the confederate congress, and later in the month Richmond was made the seat of the confederate government. Large forces of confederate troops were now concentrated in northern and eastern Virginia to resist the advance into the state of the Union army. During the year there were numerous engagements between the opposing forces, generally with advantage to the confederates, except in the western part of the state, which was cleared by the federals under Gen. McClellan. The most important battle was that of Bull Run, July 21. (See Bull Run.) Early in the spring of 1862 McClellan advanced upon Richmond by way of the peninsula formed by the York and James rivers. (See Chickahominy.) In the mean time federal military operations in the northern part of the state were under command of Generals McDowell, Banks, and Fremont. The confederate forces, inferior in numbers, were led by Gen. T. J. Jackson. Early in March the confederates began to fall back along their entire line, and were followed by the advance of the Union forces. On March 23 Gen. Shields, commanding a part of Banks's troops, repulsed an attack of Jackson near Winchester. Banks was attacked by Jackson at Strasburg on May 24, defeated at Winchester on the 25th, and forced to retreat rapidly to the Potomac. Subsequently Jackson fell back up the Shenandoah valley, and was followed by Fremont and Shields on opposite sides of the river. On June 8 an indecisive battle was fought at Cross Keys between Fremont and a part of Jackson's command under Ewell. (See Cross Keys.) Soon after, Jackson moved his troops to Richmond. In June all the federal troops in Virginia, excepting those under McClellan, were placed under command of Gen. Pope and styled the army of Virginia. The advance of the army was soon after begun. On Aug. 9 the battle of Cedar run or mountain was fought between a Union force under Gen. Banks and the confederates under Gen. Jackson. (See Cedar Mountain.) After the withdrawal of McClellan from before Richmond, Lee moved with the entire confederate force upon Pope, which led to the second battle of Bull Run, Aug. 29, 30. (See Bull Run, II.) This resulted in the defeat of the Union army and its retreat to the Potomac. After the battle of Antietam in Maryland (Sept. 16, 17) Lee returned into Virginia and took a strong position near Culpeper Court House. He was followed by McClellan, who was preparing to make an attack when on Nov. 7 he was superseded by Gen. Burnside. The latter soon after began an advance movement upon Richmond, with Aquia creek, near Fredericksburg, as the base of supplies for the Union army. He met at Fredericksburg the confederate army under Lee, and suffered a severe defeat, Dec. 13. (See FREDERICKSBURG.) The Union army now lay in camp for several months on the left bank of the Rappahannock, opposite Fredericksburg, while the confederate army was intrenched on the heights on the other side of the river. On May 2–4, 1863, was fought the battle of Chancellorsville, the federal army being commanded by Gen. Hooker. (See CHANCELLORSVILLE.) After his victory here Lee advanced north into Pennsylvania, where he lost the great battle of Gettysburg, July 1–3. He then retreated into Virginia, followed by Meade, and the two armies finally took positions fronting each other near the Rapidan river. Early in May, 1864, the army of the Potomac, under the command of Lieut. Gen. Grant, again began the advance upon Richmond. (See GRANT, ULYSSES S.; LEE, ROBERT EDWARD; WILDERNESS, BATTLES OF THE; and CHICKAHOMINY.) At the same time flank movements were made in the Shenandoah valley by Gen. Sigel, and in S. W. Virginia by Gen. Crook. Sigel advanced from Winchester toward Staunton, but was defeated at New Market by Breckenridge. Crook advanced from Charleston, W. Va., up the Kanawha valley, having Lynchburg as an objective point, but after considerable fighting he was forced to retreat. In June Gen. Hunter, who had superseded Gen. Sigel, having been joined by Gen. Crook, attacked Lynchburg with about 20,000 men, but was forced to retreat into West Virginia. Meanwhile an unsuccessful attempt was made by Gen. Butler, commanding the army of the James, to take Petersburg. In August Gen. Sheridan assumed command of the federal forces in the Shenandoah valley. For his operations there, resulting in the total overthrow of the army under Early which had crossed the Potomac and seriously threatened Washington, see UNITED STATES, vol. xvi., p. 181. The siege of Petersburg was begun by Gen. Grant in June, and was continued till April, 1865, when Richmond was evacuated. (See PETERSBURG, SIEGE OF.) Lee retreated toward Danville, closely pursued by Grant, to whom he surrendered at Appomattox Court House, April 9. On May 9, 1865, President Johnson issued an order providing for the enforcement of the federal laws in Virginia, and recognizing the administration of Francis H. Peirpoint as the loyal government of the state. This government had been organized in Wheeling in June, 1861, and had been recognized by congress. It continued to exercise its functions until the admission into the Union of West Virginia in 1863, after which, having its seat at Alexandria, it represented such parts of the state as were under federal control. (See WEST VIRGINIA.) A constitution framed by a convention which sat in Alexandria from Feb. 13 to April 11, 1864, was adopted without submission to the people. This constitution was not recognized by congress, but the civil government was allowed to continue provisionally. In May, 1865, Gov. Peirpoint assumed the executive duties in Richmond. On Oct. 12 an election was held for members of the legislature, who assembled in Richmond Dec. 4. Under the act of congress of March 2, 1867, providing military governments for the southern states, Virginia was made the first military district, to the command of which Gen. Schofield was appointed. A registration of voters (excluding all that could not take a prescribed oath) was now taken, preliminary to a vote for determining whether a constitutional convention should be held, and the choice of delegates to such convention. The number of voters registered was 221,754, of whom 116,982 were white and 104,772 colored. The vote and election took place on Oct. 22, when 14,835 whites and 92,507 blacks voted for, and 61,249 whites and 638 blacks against the convention. The total vote was 169,229; majority for the convention, 45,455. Of the 105 delegates chosen, 80 were white and 25 colored, 70 were republicans and 35 conservatives. The convention assembled in Richmond on Dec. 3, and continued in session till April 17, 1868. Provision was made for submitting the new constitution to a popular vote on June 2, but the vote was postponed. The official term of Gov. Peirpoint expired on April 4, 1868, when Henry H. Wells was appointed by the military authority to act as governor. On June 1 Gen. Stoneman succeeded Gen. Schofield in the command. The vote on the constitution was taken on July 6, 1869, when it was ratified by a majority of 197,044 in a total vote of 215,422. The clause disfranchising officials who had participated in the rebellion, and that requiring an oath of past loyalty, were rejected. At the same time state officers, representatives in congress, and members of the legislature were elected, Gilbert C. Walker being chosen governor. On Sept. 1 Mr. Wells retired, and the governor elect assumed the executive duties. The legislature assembled in Richmond on Oct. 5, and subsequently elected two United States senators and ratified the fourteenth and fifteenth amendments to the federal constitution. On Jan. 26, 1870, Virginia was admitted to representation in congress, and on the following day Gen. Canby, who had been in command of this department since April 20, 1869, transferred the government to the civil authorities. —The resources of Virginia are fully described in the work on the state prepared, under the direction of the board of immigration, by Maj. Jed. Hotchkiss of Staunton (Richmond, 1876), advanced sheets of which have been used in the preparation of this article. (See supplement.)

VIRGINIA. See CLAUDIUS CRASSUS.

VIRGINIA, University of, an institution of learning in Albemarle co., Virginia, 1½ m. W.

of Charlottesville. The name of the post office is the same as that of the institution. In 1818 the general assembly voted an annual appropriation of $15,000 to endow and support the university, which was chartered in 1819 and opened in 1824. Its organization, plan of government, and system of instruction are due to Thomas Jefferson, who in the inscription prepared by himself for his tomb preferred to be remembered as the "author of the Declaration of Independence and of the statute of Virginia for religious freedom, and father of the university of Virginia." The government of the university is vested in a board of visitors composed of a rector and eight members. The visitors are appointed every fourth year by the governor of the state, and they select the rector from their own number. The office of rector was first held by Mr. Jefferson, and after his death successively by James Madison, Chapman Johnson, and J. C. Cabell. The present rector (1876) is R. G. H. Kean. The affairs of the institution are immediately administered by the faculty, who are appointed by the board of visitors. The chairman of the faculty is selected annually by the board from the faculty, and performs most of the duties of president of the university. The professors are paid in part by salaries ($1,000 each), and in part by tuition fees from pupils who attend their several schools. Besides the plan of government, the substitution of a chairman of the faculty for a permanent president, and the mode of remunerating professors, the chief distinguishing features of the university are its organization into independent schools and the system of conferring degrees for proficiency in any one school or in a number of schools collectively. No general curriculum is prescribed. Students may select for each year such schools and as many as they wish to attend, but in general they are advised to limit themselves to three. In the academic department each one is required to attend at least three, unless permitted by the faculty to take fewer. In some of the schools the course of study occupies three years; in several the time is less. The mode of instruction is by lectures and text books, with daily oral examinations. There are also semi-annual examinations in writing. Discipline is sought chiefly by appeal to each student's sense of honor. Each school is placed under the charge of a professor; in several there are one or more assistant instructors. The schools in operation are as follows: 1, Latin; 2, Greek; 3, modern languages; 4, moral philosophy; 5, history, general literature, and rhetoric; 6, mathematics; 7, natural philosophy (including mineralogy and geology); 8, applied mathematics, engineering, and architecture; 9, analytical and agricultural chemistry; 10, natural history, experimental and practical agriculture; 11, comparative anatomy, physiology, and surgery; 12, anatomy and materia medica; 13, medical jurisprudence, obstetrics, and practice of medicine; 14, chemistry and pharmacy; 15, common and statute law; 16, equity, mercantile and international, constitutional and civil law, and government. The school year begins on Oct. 1, and continues without interruption until the Thursday before the 4th of July. The degrees conferred by the university after written examination are academic and professional. The former are: 1, that of a proficient, conferred for satisfactory attainments in certain studies which do not constitute a full school; 2, graduate in a school, conferred for satisfactory attainments in the leading subjects of instruction in any school; 3, bachelor of letters, conferred upon students who have graduated in the schools of ancient and modern languages, moral philosophy, and history and literature; 4, bachelor of science, conferred upon students who have graduated in the schools of mathematics, natural philosophy, and general chemistry, and have made certain attainments in mineralogy and geology, applied mathematics, and analytical chemistry; 5, bachelor of arts, obtained by graduates in the schools of Latin, Greek, general chemistry, moral philosophy, and French or German, who have made certain attainments in mathematics, physics, and history and literature; 6, master of arts of the university of Virginia, conferred upon students who have

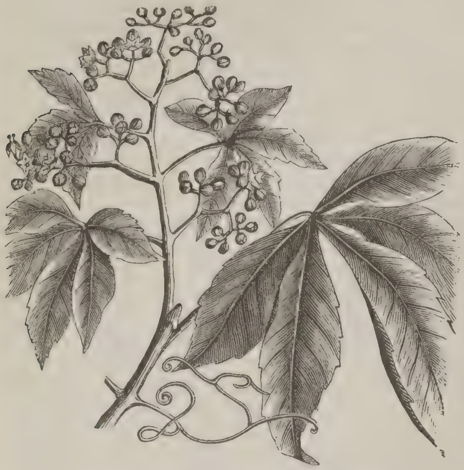
The Rotunda.

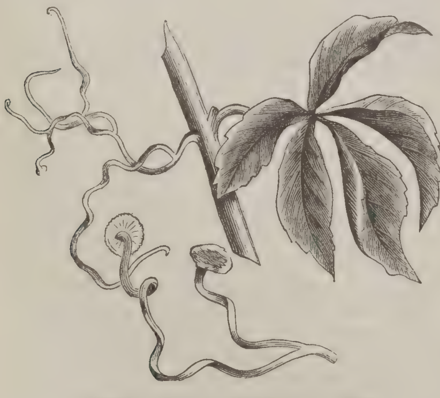
graduated in the Latin, Greek, French, and German languages, pure mathematics, natural philosophy, general chemistry, moral philosophy, and history and literature, and who have passed satisfactory general examinations in review on all the studies of these schools. The candidate for the degree of master of arts is also required to prepare an essay on some subject of literature or science. The professional degrees are: 1, bachelor of law, conferred upon those who have graduated in both schools of law; 2, doctor of medicine; 3, civil engineer; 4, mining engineer; 5, civil and mining engineer. In conferring degrees no requirement is made as to length of residence at the university. No honorary degrees are conferred. The annual tuition fees of academic students attending three schools amount to $75, exclusive of the matriculation and library fee of $30; students in law, $80; civil engineering (three schools), $100; medicine, $110. The aggregate necessary expenses of academic students, exclusive of text books, clothing, &c., range from $271 to $391 a year. Clergymen and indigent students preparing for the ministry may attend any of the schools without paying fees to the professors. In 1875 the annual state appropriation for the university was increased to $30,000, in consideration of which it will receive in the academic schools, free of charge for tuition, any Virginia student over 18 years of age, who upon examination is found to be prepared to profit by the instruction he seeks to obtain. Prior to 1875 the number of state beneficiaries was 50. They were appointed by the faculty, and received tuition and the use of rooms free of charge. Eleven scholarships, entitling the holders to instruction for one year without payment of matriculation or tuition fees, are open by competitive examination to students from any state. There are also 40 farmers' scholarships, providing free tuition for two years in certain schools whose studies relate to scientific and practical agriculture. The department of agriculture was established in 1869 by means of the gift of $100,000 made by Samuel Miller of Lynchburg. In 1875–'6 there were in the university 17 instructors and 330 students. The total number of matriculates was about 15,000. The library contains 36,000 volumes.

VIRGINIA CITY, the chief city of Nevada, county seat of Storey co., in the Washoe mountains, at the terminus of the Virginia and Truckee railroad, by which it is 52 m. S. S. E. of Reno on the Central Pacific railroad and 21 m. N. N. E. of Carson City, about 180 m. (direct) N. E. of San Francisco; pop. in 1860, 2,345; in 1870, 7,048, of whom 3,456 were foreigners, including 539 Chinese; in 1875, about 16,000, of whom about 900 were Chinese. It is built on the famous Comstock lode (see NEVADA, vol. xii., p. 265) at the E. foot of Mt. Davidson, which rises 1,622 ft. above the main street and 7,827 ft. above the sea. It is regularly laid out on a precipitous site, with broad streets and avenues, but is destitute of shade trees and unattractive in appearance. The principal public buildings are the masonic hall, odd fellows' hall, county court house, miners' union hall, county hospital, and St. Mary's hospital. It is lighted with gas, and is supplied with water from the summit of the Sierra Nevada, 25 m. distant, through an iron pipe. The chief business is mining. The older mines are the Hale and Norcross, the Savage, Gould and Curry, the Ophir, the Mexican, and the Best and Belcher. The celebrated consolidated Virginia mine in 1875 yielded more than $17,000,000, and in March, 1876, produced $3,634,000. The California mine, said to be the richest in the world, joins the consolidated Virginia on the north. It is officially estimated that the ultimate yield of these two mines will be $300,000,000. There are five public schools (one high and four grammar), a Roman Catholic school, several private schools, two daily newspapers, five church edifices (Baptist, Episcopal, Methodist, Presbyterian, and Roman Catholic), and several religious societies without edifices.—The Comstock lode was discovered in 1858 by a Virginian, from which circumstance the city derives its name. Its settlement began in 1859, and it was incorporated in 1861. On Oct. 26, 1875, a fire destroyed more than half the city. Prior to March, 1876, the burnt district had been almost entirely rebuilt, and several handsome structures erected.

VIRGINIA CITY, a city and the county seat of Madison co., Montana, on the N. bank of Alder creek, a tributary of Stinkingwater river, on the E. slope of the Rocky mountains, 5,826 ft. above the sea, 110 m. S. of Helena; pop. in 1870, 867, of whom 279 were Chinese; in 1875, about 1,200. The streets are regularly laid out. It is connected by regular lines of stages with the Utah Northern railroad, 350 m. S. It is supported by the placer and quartz mines in the vicinity, which have yielded $40,000,000. The city contains a court house and jail, costing $35,000; a public school house, costing $8,000; two banking houses, two weekly newspapers, a public library, and three churches (Episcopal, Methodist, and Roman Catholic). —Virginia City was settled in 1863, upon the discovery of gold in Alder gulch, and was incorporated in 1865. It was the capital of the territory from 1865 to January, 1875, when the seat of government was removed to Helena.

VIRGINIA CREEPER, a woody climbing vine of the grape family, peculiar to North America, and found from Canada to Texas. It was placed in the genera *vitis* and *cissus* by the earlier authors, but as it differs from these in having no disk or glands to the flower, Michaux established for it a separate genus, *ampelopsis;* both this and *cissus* are reduced to *vitis* (the vine) by Bentham and Hooker, though in American botanical works Michaux's name *ampelopsis quinquefolia* is retained for the plant, which is often called *A. hederacea* by European authors. The plant climbs extensively, often as high as 50 ft. or more, by means of tendrils, and sometimes by rootlets also; the leaves, upon long petioles, are palmately divided into five oblong-lanceolate, cut-toothed leaflets, of a dark shining green; the flowers, in cymes opposite the leaves, are small, with a very short, obscurely five-toothed calyx, and five thick, fleshy petals, which fall soon after opening; stamens five; the ovary, surmounted by the stigma, two-celled, and ripening into a dark blue, globular, two- to four-seeded berry; at the same time the fruit stalks become a rich red color. The tendrils, borne at the nodes opposite the leaves, are branched as in the grape, though much shorter, and do not like those catch around a support by means of their hooked tips; the tendrils of this turn from the light toward the tree or wall against which the vine grows, where their tips, when they come in contact with the support, expand, and form a disk which adheres to the surface with great tenacity; those tendrils or branches which do not become attached soon wither, while the others, which spread themselves as far apart as possible, when they have taken firm hold by their disks contract into coils and become strong and wiry, so that the plant is held to its support by numerous elastic springs. As an ornamental climber this is one of the most valued, especially as its leaves in autumn assume the richest shades of scarlet, crimson, and purple. The vine is also often called American ivy and American woodbine, names suggested by a similarity of habit. The name American ivy has caused many to confound it with the poison ivy (*rhus toxicodendron*), which also climbs walls and high trees, and the two are often found growing together; the poison ivy (see SUMACH) is a very dangerous plant, while this is perfectly harmless; they are easily distinguished by their three-parted and five-parted leaves, and it may be well to remember that no native vine with a five-parted leaf is poisonous.—For a long time this was the only species of *ampelopsis* in cultivation, but within a few years one has been introduced from Japan which is becoming very popular. It is called in the catalogues *A. Vietchii*, but it was many years ago described by Siebold and Zuccarini as *A. tricuspidata*, which is the prior and correct name. This Japan creeper has three-lobed (not divided) leaves, which are much smaller than in the other, and cover a wall with the densest curtain of foliage; the leaves of this also turn to brilliant colors in autumn; it has proved quite hardy near Boston.


Virginia Creeper (Ampelopsis quinquefolia).


Virginia Creeper—Tendrils and Disks.

VIRGIN ISLANDS, a group of the West Indies, E. of Porto Rico, between lat. 17° 30′ and 18° 50′ N., and lon. 64° 10′ and 65° 30′ W.; total area, about 250 sq. m.; pop. about 45,000. They are about 100 in number, 50 of which, including Tortola, Anegada, Virgin Gorda, Jost van Dyke's, Guano isle, Beef island, Thatch island, Prickly Pear, Camanas, Cooper's, St. Peter's, and Salt, belong to Great Britain; St. Thomas, Santa Cruz, St. John, and several smaller ones to Denmark; Culebra and a number of islets to Spain; and Viéques, or Crab island, to all three powers. Not more than one fourth of the group are inhabited. Sugar, molasses, rum, indigo, salt, cotton, tobacco, turmeric, pimento, and ginger are exported. The climate is variable, and there are occasional earthquakes. The British islands (area, 57 sq. m.; pop. in 1871, 6,651) were included in 1872 in the confederation of the Leeward Islands, to the governor of which the executive officer, called president, is directly responsible. The revenue in 1872 was £1,685, the expenditure £1,631. The group was discovered by Columbus in 1494.

VIRGIN'S BOWER. See CLEMATIS.

VIRIATHUS, a Lusitanian warrior, assassinated in 140 B. C. He was one of those who escaped the slaughter of the Lusitanians in 150 by Servius Sulpicius Galba. In 147 he was chosen general by the Lusitanians, who continued the conflict against the Romans. After extricating his troops from a fortress in which they had been shut up by Vetilius, he drew the forces of the latter into an ambuscade, and defeated them. In the following years he ravaged the Roman territories, and successively defeated the troops sent against him; but in 144 he was routed by Q. Fabius Æmilianus, and again in 143 by Q. Pompeius, whom however he shortly afterward signally vanquished. In 142 the consul Q. Fabius Servilianus gained great advantages over him, and took many of his cities, but Viriathus finally surrounded him in a mountain pass and captured him with his entire army. He concluded a treaty with the Romans by which the Lusitanians were guaranteed the peaceable possession of their own country and were recognized as allies of Rome. This treaty was broken the next year, with the connivance of the Roman senate, by the consul Q. Servilius Cæpio, who invaded Lusitania, and bribed three envoys of Viriathus, sent to negotiate for peace, to murder him.

VIRUS. See VENOM.

VISCACHA. See LAGOTIS.

VISCONTI, a family of rulers of Milan, whose prominence began with Ottone, who in 1262 was appointed archbishop by Pope Urban IV., and waged a sanguinary struggle with the Della Torre family for mastery in the city and territory. The struggle was continued by his nephew Matteo I., the Great (1250–1322), who, after obtaining supreme power, had to contend with a league formed against him by the Torriani and the lords of Montferrat, Piacenza, and Pavia, and was driven from Milan, but reestablished by the emperor Henry VII., who put a final end to the rule of the Torriani in 1310–'11. Matteo extended his dominion over several places; but Pope John XXII. raised against him the Guelphs under the king of Naples, and other enemies, and he was finally constrained to resign a few months before his death. His son and successor Galeazzo I. (1277–1328) continued the warfare, and a papal force in 1323 burned the suburbs of Milan and most of the adjacent fortified castles. But the emperor Louis the Bavarian came to his rescue, and the pontifical forces, after being decimated by an epidemic, were overwhelmed in 1324. In 1327, when the emperor was crowned at Milan as king of Lombardy, he appointed Galeazzo imperial vicar. He soon after incarcerated him at Monza, with his son Azzo and his two brothers, on the pretext of their conspiring against him with the Roman see, but released them on their paying a heavy ransom. Azzo (1302–'39) improved the condition of Milan, and his uncle and successor Lucchino annexed most of Lombardy and Montferrat, and promoted art and science. Lucchino's brother Giovanni (1290–1354) extended his rule over many cities of Tuscany. He left the government to his nephews Matteo II., Barnabò, and Galeazzo. The first soon died from poison ascribed to his two brothers. Barnabò waged war against the papal see till 1385, when he was deposed and imprisoned by his nephew Giovanni Galeazzo, under whom the Visconti reached their highest glory. He expelled the Scalas from Verona and Vicenza, and the Carraras from Padua. For 100,000 florins he received in 1395 the title of duke of Milan from the emperor Wenceslas. He died of the plague in 1402. He was a munificent patron of art, and the founder of the cathedral of Milan. His children were minors at the time of his death. The eldest, Giovanni Maria, became duke, but lost many of his possessions, and his cruelty and pusillanimity caused his assassination in 1412. The reign of his brother Filippo Maria was one series of wars, chiefly against the Venetians. He died in 1447, without male heirs, and Francesco Sforza, husband of his natural daughter Bianca, secured the duchy of Milan for himself and his descendants. Collateral branches of the family still exist in Lombardy.

VISCONTI. I. Ennio Quirino, an Italian archæologist, born in Rome, Nov. 1, 1751, died in Paris, Feb. 7, 1818. His father, Giovanni Battista Antonio Visconti, was a Genoese descendant of the Visconti of Milan, and in 1768 succeeded Winckelmann as superintendent of antiquities at Rome. He organized the museum, later known as the museo Pio-Clementino, in the Vatican, and undertook excavations which resulted in the discovery of the grave of the Scipios and other memorable relics. He made himself the principal instructor of his son, to show the superiority of private over public tuition, and with the same object published *Experimentum Domesticæ Institutionis* (2 vols., Rome, 1762–'4); and Ennio was only 14 years old when he translated the *Hecuba* of Euripides into Latin verse (1765). In 1771 he took his degree in law, and entered the service of the pope as honorary chamberlain and as sub-librarian of the Vatican; but on his refusing to take holy orders he was deprived of these offices. He became private librarian of Prince Ferdinando Chigi, and about 1785 was placed at the head of the capitol museum. Under the French provisional government he became in 1798 minister of the interior, and subsequently was for seven months one of the five consuls of the new republic, when he founded the institute at Rome. After the expulsion of the French he finally took refuge in France at the close of 1799, and became administrator of the collections of the Louvre, and in 1803 a member of the institute. His works include *Monumenti degli Scipioni* (Rome, 1780); *Museo Pio-Clementino* (7 vols., 1782–1807, the first volume published under his father's name); *Iscrizioni greche Triopee, ora Borghesiane* (1794); *Descriptions des antiques du musée national du Louvre* (Paris, 1801; new ed., 1807); *Iconographie ancienne* (Greek and Roman, 5 vols. fol., 1808–'20, published at the suggestion and mainly at the expense of Napoleon, and completed by Mongez); and the posthumous *Illustrazioni di monumenti scelti Borghesiani*, edited by Stefano Palli and J. G.

de' Rossi (1821). His complete works on art appeared at Milan (12 vols., 1818–22), and his miscellaneous writings in Italian and French, edited by Giovanni Labus (3 vols., 1827–'32). **II. Louis Tullius Joachim,** a French architect, son of the preceding, born in Rome, Feb. 11, 1791, died in Paris, Dec. 29, 1853. He completed his studies at the school of fine arts in Paris in 1817, and was connected with various works till 1825, when he became architect of the royal library, which he in vain strove to restore on a grand scale. His principal works were the fountain for the place Louvois, begun in 1835, and other fountains, monuments on the tombs of great warriors, and several palaces, especially the Collet palace on the quai d'Orsay. His masterpiece was the mausoleum of Napoleon at the Invalides.

VISCOUNT (Lat. *vice-comes*), a dignity in the British peerage, which ranks next below that of earl. The application of the title as a dignity dates from the time of Henry VI., though as a title of office it is much older. Anciently a *vice-comes* was the deputy of a count or earl, under whom he performed duties similar to that of a sheriff.

VISCUM. See Mistletoe.

VISHNU. See India, Religions and Religious Literature of, vol. ix., p. 229.

VISIGOTHS. See Goths.

VISION (Lat. *visio*, from *videre*, to see), a term employed to denote, in different relations, the power, the act or process, or the object of sight. The behavior of rays of light reflected or transmitted through various media, among which are the lens and humors of the eye, and the manner in which images come to be formed at the retina, are considered under Optics. For the parts of the eye, and the action of the humors and iris, see Eye.—The mere action of rays of light upon the retina is not sufficient to secure the actual perception of the objects they proceed from. Of the other conditions, the most indispensable for distinct vision is that the divergent pencil of rays emanating from any one point of the object shall be brought to its proper focus at the level of the retina. But if the object be so near the eye, say within 6 in., that the convergent power of the lens fails to bring the pencils of light to a focus, or if the pencils from very distant objects in eyes too powerfully convergent are focalized and again dispersed before reaching the retina, no distinct perception takes place, but only a sense of light or brightness in greater or less degree. The least distance at which objects can be distinctly seen is termed the limit of distinct vision; it is for different eyes between 6 and 12 in. At remoter distances the several pencils admitted by the small opening of the pupil, about $\frac{1}{10}$ in. in diameter for an object at 6 in., may be regarded as consisting each of nearly parallel rays. For an object at 10 in., the angular divergence of each pencil is little over half a degree; and generally, it may be said that distinct vision is due to bundles of rays very slightly divergent or sensibly parallel. Hence, the object brought much nearer the eye is still distinctly visible through a pin hole, the edges of which cut off the too divergent rays; or through a lens sufficiently convex to complement, in converging the pencils, the effect of the eye. Thus, for distinct vision, the image must be at the retina, and distinctly formed there. Again, since there are degrees of faint illumination not allowing of sight, it must be sufficiently bright or intense. Thus, in cases of cataract or opacities of the organ, distinct vision gradually becomes impossible, except by the stronger degree of brightness of the objects. Many stars are wholly unperceived until the light emitted by each of them has been collected and concentrated from over a larger space than that afforded by the pupil, as by use of a large convex lens. On the other hand, excessive brilliancy dazzles the eye, the impression not resulting in perception of the object, but often in pain, or in positive injury to the structure and the sensibility of the retina. Again, the image must have a sensible magnitude. When a single shoot of young corn at a distance is quite invisible, the several shoots of like size in a hill, impressing a larger space on the retina, may come clearly into view; but the rows are, on the same principle, more distinctly seen than the single hill could be. Ehrenberg finds that the smallest square magnitude visible near at hand to the naked eye, white on a black ground, or the reverse, is about $\frac{1}{405}$ of an inch. With effort, a less spot may be seen; and if, like gold leaf, the particle reflects light powerfully, it may be seen down to a fineness of $\frac{1}{1125}$ of an inch. On the principle of extension already referred to, lines of much greater fineness are visible—if opaque, and viewed toward the light, down to the $\frac{1}{4900}$ of an inch diameter, or about half the thickness of the silkworm's fibre. The magnitude and extreme limit of distance and visibility of an object vary also with its brightness, and hence with its color. A white object in sunlight is seen at a distance of 17,250 times its diameter; in the same light a red object of like size only about one half as far; a blue object at somewhat less distance than a red one. But all small or distant objects become more readily visible when the background or surrounding objects present to it the strongest contrast, as in the case of a black object on a white ground, or a white object on a black ground. Though the human eye is capable of seeing objects both at great and small distances, yet most persons, wishing minutely to examine an object, place it at 8 to 10 in. before the eyes. But one whose eyes lack convergent power must remove the object further away to obtain distinct vision, and such a one is said to be long-sighted; this condition is *presbyopia*, and is remedied by use of convex eye glasses. On the other hand, when from any cause too rapid convergence takes place, the object must be brought close to the eye, so as to carry its image back to the retina, and one thus affected is said to be near-sighted; this condition is *myopia*, and is remedied by concave eye glasses. Like any other lens, the crystalline has its optic centre; this coincides nearly with its centre of form. The direction of every ray passing through this is nearly the same after as before transmission. Consequently, every such ray is an axis of a pencil of rays from some point of the object. The pencil of rays coming from the point directly before the eye has its axis corresponding with the principal or "optic axis" of the eye, passing through very nearly the centres of the pupil and lens, and meeting the retina in a direction perpendicular to its surface, at the middle point of the small circular area which is the seat of most distinct vision.—In providing for accurate vision under different circumstances, a very important element is the alternate contraction and dilatation of the pupil. When exposed to a strong light so intense that it would dazzle the eye and thus produce indistinctness of vision, the pupil contracts, shutting out a portion of the luminous beam, and thus reducing the amount of light to that which is readily borne by the eye. On the other hand, on first entering a darkened apartment with the pupils in a contracted condition, we may be incapable of perceiving surrounding objects; but within a few seconds the pupils enlarge, admitting a greater amount of light to the eye, and everything in the apartment soon becomes distinctly perceptible. In some of the lower animals, whose vision adapts itself to extreme conditions of light and darkness, as in the cat, the variations in size of the pupil are exceedingly marked; this opening being reduced in broad sunlight to a nearly imperceptible slit, while at night it is so expanded that the borders of the iris almost disappear.—Notwithstanding the perfection of our visual apparatus, there is still only a small space directly in front of each eye within which objects can be distinctly seen. Outside of this space there is a field or circle of considerable extent within which we can perceive, though indistinctly, the presence of luminous objects; and this is called "the field of vision." In man, when using both eyes immovably fixed, the field of vision within its extreme limits subtends an angle of about 180°; everything outside of this circle being invisible to us, because the rays of light coming from the sides and behind cannot enter the pupil. In many of the lower animals, particularly in birds and fishes, there is reason to believe that the field of vision is very much more extensive than this, owing to the lateral position of the two eyes, one being placed on each side of the head, and to the great prominence of the eyeball and its high refractive power, in consequence of which rays of light coming in an extremely oblique direction are bent inward and made to enter the pupil. It is certain, for example, that the ostrich can see objects directly behind him; for a spectator placed in this position can see both the pupils, and is of course himself visible to the animal. In some fishes, if not in most of the class, there appears to be really no limit to the field of vision in any direction; so that the animal can perceive rays of light coming from every point of the sphere, excepting that actually occupied by his own body. But even within the field of human vision there is only a single spot in its centre at which objects can be seen distinctly, that is, where their form and outlines are accurately perceived. Thus, when we stand in front of a row of upright stakes or poles, we can see those placed directly in front of the eye with perfect distinctness, while those placed a little on either side, though perceptible, are indistinct. When we look steadily at the middle of a printed page we see the distinct form of each separate letter only immediately in front; above, below, and on each side of this spot, at successive distances, the letters first become confused, then run into each other, and finally the distinction of letters and words is lost, and we perceive only the lines and spaces. The straight line extending directly in front of each eye, upon which alone objects are distinctly perceived, is called the "line of distinct vision." Everything above or below this line, to the right or the left, is perceived only in an imperfect manner. This is practically compensated for by the mobility of the eyeballs, by which we are enabled to direct the line of distinct vision to all parts of the space in front, in rapid succession. When reading, for instance, the eyes follow the printed lines from left to right, seeing each letter and word distinctly in succession. Consequently an object can be distinctly perceived by both eyes simultaneously only when placed at a certain distance, namely, at that point where the two visual axes, or the lines of distinct vision for the two eyes, cross each other. As the eyes are situated two or three inches apart in their orbits, when they are both directed toward the same object their visual axes converge and meet at the situation of the object. Thus, although we look with two eyes, we see but a single object; because, as the two lines of vision meet at a single point, the two distinct images exactly cover each other and so form but one. But either within or beyond this point vision becomes both double and indistinct. Thus, on holding up a slender rod at a distance of one or two feet in front of the face, and in the same range with any similar object, such as a door knob, on the opposite side of the room, if we direct both eyes to the rod we see it distinct and single, while the door knob appears as two indistinct images, one on each side. If we now direct the eyes to the door knob, it in turn becomes distinct and single, while the rod is doubled and confused in outline. This is because when we look at the nearer object so as to see it distinctly, the further one is still within the field of vision, and is therefore perceived; but it is perceived with imperfect outlines, since it is outside the line of distinct vision. But for the right eye it is to the right of this line, and for the left eye to its left; and the two images therefore no longer occupy the same spot, and the object accordingly appears double. On this account we never see all parts of a landscape, even directly in front, with distinctness at the same time. The fore ground, the middle ground, and the distance are each examined separately; and when one is distinct, the others are always more or less confused.—One great advantage of the simultaneous action of the two eyes, as above described, is that we are thus enabled to judge in great measure of the distance of an object. As the angle of convergence of the two eyes varies according to the distance at which an object is placed, we instinctively appreciate the amount of this convergence and consequently the distance of the object. A still greater advantage is, that by using two eyes we appreciate the qualities of solidity and projection of foreign bodies. Vision with but one eye presents a simple expanse or variously shaded and colored picture in front of the visual organ. But since the two eyes are placed at a certain distance from each other, and their visual axes, as above mentioned, are convergent, it follows that for near objects it is not precisely the same figure which is perceived by each eye. If we look, for example, at a square box at the distance of a few feet, both eyes will see the front of the box equally well; but in addition the left eye will see a little of its left side in perspective, and the right eye will see a little of its right side. These two images, occupying the same spot at the convergence of the visual axes, are perceived as one; and it is by this combination of two different figures that we acquire the perception of the solidity of the object examined. We feel that it is not a flat picture, because in that case the same image would be presented to each eye; and however well it might be painted, such a picture could never deceive us, if looked at with both eyes simultaneously. It is on this principle that the stereoscope is constructed. (See STEREOSCOPE.)—A change is also required in transferring the sight from near to remote objects, or *vice versa*, which is called the accommodation of the eye to distinct vision at different distances. The eye is a natural optical instrument, consisting essentially of a sensitive nervous expansion, the retina, intended to receive the impression produced by luminous rays, and of various refracting media, destined to converge these rays to a focus at the surface of the retina. The distinctness of vision depends upon the accuracy with which the rays of light, diverging from all parts of a luminous object, are brought to a focus exactly at the level of the sensitive membrane destined to receive them. The most important and efficient of the refracting parts of the eye is the crystalline lens, a doubly convex transparent body, of considerable density, immediately behind the pupil and some distance in front of the retina. As the original divergence of the luminous rays passing through the pupil varies with the distance of the object from which they emanate, the crystalline lens, if both its refracting power and its position remained the same, could not bring the rays to a focus at the same point behind it, for luminous objects at different distances. For example, suppose the lens to be so arranged that the rays from an object at the distance of 6 in. may be accurately focussed at the retina. If the object be now removed to a distance of 30 in., the divergence of its rays at their entrance through the pupil will be diminished; but, the refractive power remaining unaltered, they will now be converged more rapidly than before. They will accordingly meet and cross each other; and when they reach the lens they will have already become partially dispersed, the effect of this being to produce partial indistinctness of vision. This difficulty is met with in telescopes and spy glasses, and is obviated in them by shifting the relative distance of the object glass and the eye piece, when the instrument is turned from a near object to a remote one, or *vice versa*. In the eye the correction might be accomplished either by moving the lens backward and forward, so as to vary its distance in front of the retina, or by changing its refractive power, to correspond with the varying distances of visual objects. The experiments of Donders and others have shown conclusively that the latter method is that which is really employed by nature. If the eye be accommodated for vision of a distant object, and a lighted candle be then held in front of it and a little on one side, an observer will perceive three reflected images of its flame in the eyeball; namely, one from the anterior surface of the cornea, one from the anterior surface of the lens, and a third from the posterior surface of the lens. If the sight be now changed from the distant to a near object, the reflected image upon the cornea remains unaltered, but that from the anterior surface of the lens diminishes and moves slightly forward. The third reflection also diminishes a little, but is not altered in position. These changes show that in shifting the accommodation of the eye from distant to near objects, the lens increases the curvature of its surfaces and of course its refractive power, the bulging taking place principally in front. When the sight is shifted from near to remote objects, of course these changes are reversed. Thus, when we look at a near object, the refractive power of the lens is increased, and the diverging rays are more powerfully refracted; when we look at an object comparatively remote, the refractive action is diminished, and the slightly divergent rays are still brought to a focus exactly at the surface of the retina. This alteration in the form of the lens is accomplished by means of the internal muscular apparatus of the eye. It is much more marked when the changes are made between objects at short than at long distances, since the difference in the angular divergence of the rays is greater in the former case than in the latter. Accordingly, much greater accommodating power is required for shifting the sight from a distance of 6 in. to 12 in., than from 12 in. to 24 in.; and for all distances beyond 50 ft. the change required is comparatively trifling.—A remarkable fact in regard to vision is that of the temporary persistence of visual impressions. If a bright object be presented to the eye, and then suddenly obscured, the impression of light remains upon the retina for a short interval of time after the luminosity has actually disappeared; and if the luminous body be again restored to its position before this interval has elapsed, we fail to see that it has disappeared at all. Thus the act of winking, by which the light is momentarily excluded from the eye, does not interfere with vision, because it is performed and terminated so rapidly that the images of external ojects appear to remain upon the retina until they are again actually perceptible. A lighted stick revolving with rapidity presents the appearance of a luminous circle; and the successive sparks thrown off from a knife grinder's wheel produce the impression of a continuous stream of fire.—Closely connected with this part of the subject is the question of the amount of time required by the eye for the perception of light and the distinct vision of luminous objects. It is well known that if a darkened apartment, containing objects in rapid movement, as for instance revolving wheels, be suddenly illuminated by an electric spark of sufficient intensity, the wheels will be perceived, but will be seen as if at rest. The duration of the spark is so short that the spokes of the wheel do not move far enough in the interval of illumination to confuse each other's outlines upon the retina; and yet the illuminated bodies are perceived with perfect distinctness. Prof. O. N. Rood ("American Journal of Science and Arts," September, 1871) has shown that visual perception may take place within an interval of time exceedingly minute. In his experiments the illuminating agent was the electric spark from a Leyden jar, passed between platinum points separated by a distance of $\frac{1}{25}$ of an inch. The illuminated object was a glass plate ruled with parallel black and white lines, each $\frac{1}{600}$ of an inch in thickness. The image of this plate was thrown, through an achromatic lens, upon a mirror revolving upon its axis at the rate of 340 times a second, and thence reflected upon a surface of plain glass, where it was brought to a focus and viewed by a telescopic eye piece. The images of the black and white lines, moving with the revolution of the mirror, would thus become mingled and confused if the illumination lasted long enough to allow them to pass over a space equal to their own diameters; and the duration of the electric spark was thus determined to be in some instances hardly more than $\frac{4}{100,000,000,000}$ of a second. Yet with this illumination the letters on a printed page were plainly to be seen, and with a polariscope the cross and rings around the axes of crystals could be observed with all their peculiarities. An illumination continuing forty billionths of a second is therefore sufficient for distinct vision.

VISTULA (Pol. *Wisła;* Ger. *Weichsel*), a river of central Europe, which has its sources in the Jablunka mountain, a branch of the Carpathians, in the S. E. corner of Austrian Silesia, and traverses Galicia, Russian Poland, and Prussia, passing Cracow, Sandomir, Pulawy, Warsaw, Modlin, Plock, Thorn, Culm, Graudenz, and Marienburg. Near the village of its name in Silesia it has a fall of nearly 200 ft. It flows into the Baltic by three mouths, of which one is at Dantzic, and the other two open upon the sound called the Frisches Haff. Its length is about 650 m., and it is navigable to Cracow, about 550 m. Its principal affluents are the Dunajec, San, Wieprz, Bug, and Drewenz from the right, and the Pilica, Bzura, and Brahe from the left. It is connected by canals with the Dnieper, the Oder, and the Niemen.

VITEBSK, or Witebsk. I. A government of West Russia, formerly belonging to the Lithuanian provinces of Poland, bordering on Pskov, Smolensk, Mohilev, Minsk, Wilna, Courland, and Livonia; area, 17,438 sq. m.; pop. in 1870, 888,727. The principal river is the Düna. The soil is moderately fertile. Large numbers of domestic animals are reared, and there are extensive forests of valuable timber. The Düna and its connecting canals afford channels for a flourishing export trade. The principal towns, besides the capital, are Polotzk, the oldest in White Russia, Dünaburg, Velish, and Nevel. **II.** A town, capital of the government, on both sides of the Düna at its confluence with the Viteba, 76 m. N. W. of Smolensk, with which, as well as with Riga, it is connected by rail; pop. in 1867, 28,944, including many Jews. It is surrounded by ancient fortifications, and contains 15 Greek and Catholic churches, 10 convents, and a gymnasium. Mead and cloth are largely exported.

VITELLIUS, Aulus, a Roman emperor, born about A. D. 15, killed in Rome in 69. He became consul in 48, was subsequently proconsul of Africa, and afterward legate of the same province under his brother. His vices made him a favorite of the emperors Tiberius, Caligula, Claudius, and Nero; and when Galba ascended the throne he was placed in command of the legions of Lower Germany. In January, 69, he was saluted at Cologne with the title of *imperator*, and a civil war broke out between him and Otho, who had dethroned Galba. Vitellius was given chiefly to eating and drinking, and was totally unfit for the high position he had received; but his soldiers marched into Italy under Valens and Cæcina, and near Bedriacum, in Cisalpine Gaul, completely defeated Otho, who killed himself. Most of the armies of the empire now acknowledged Vitellius, and he marched to Rome. But the eastern armies proclaimed Vespasian emperor; and Antonius Primus, acknowledging the latter, marched with the legions of Illyricum into Italy, and, after defeating the armies of Vitellius, reached Rome. The emperor was dragged through the streets and killed.

VITELLUS. See EMBRYOLOGY, vol. vi., p. 561.

VITERBO, a town of central Italy, at the foot of Monte Cimino, an extinct volcano, in the province and 40 m. N. W. of the city of Rome; pop. in 1872, 20,637. It is surrounded by walls and towers, and contains a Gothic cathedral standing on the site of a temple of Hercules, and many other interesting churches and palaces. There are Etruscan antiquities, warm sulphur springs within 2 m. of the town, and sulphur refineries. Early Italian writers called it the city of beautiful fountains and women. Viterbo is supposed to occupy the site of the ancient Fanum Voltumnæ, where the Etruscan league held its assemblies. The present town dates from the 8th century. In the 11th century it was granted to the pope as part of the territory known as the patrimony of St. Peter. It was the capital of a papal delegation till 1870, when it was incorporated with the kingdom of Italy.

VITORIA, a town of Spain, capital of the Basque province of Álava, 29 m. S. S. E. of Bilbao; pop. about 19,000. The older parts are poorly built and dilapidated, but the new town has fine streets and squares. It has manufactures of stained paper, hats, brushes, combs, carriages, leather, mirrors, and articles in iron and copper. Its trade has declined since the removal of the custom house to the frontier. It probably existed under the Romans, and received its present name from Sancho the Wise of Navarre in commemoration of a victory over the Moors about 1180. On June 21, 1813, Wellington defeated here the French under Joseph Bonaparte and Jourdan, capturing 150 guns and $5,000,000 worth of plunder, the booty of the five years' occupation of the peninsula.

VITRIOL, Blue. See COPPER, vol. v., p. 319.

VITRIOL, Oil of. See SULPHURIC ACID.

VITRUVIUS POLLIO, Marcus, a Roman architect, of whom it is only known that he probably served as a military engineer under Cæsar and Augustus. His treatise *De Architectura* is a compendium of the works of Greek writers, with much of his own knowledge and experience. The first edition was printed at Rome about 1486, and it has been many times edited and reprinted; the latest editions are those of J. G. Schneider (3 vols. 8vo, Leipsic, 1807–'8), Stratico (4 vols., Udine, 1825–'30), Marini (4 vols. fol., Rome, 1836), and Rose and Müller-Strübing (Leipsic, 1867). There are English translations by Robert Castell (2 vols. fol., London, 1730); by W. Newton, with notes and plates (2 vols. fol., 1771–'91); by W. Wilkins (4to, 1812); and by Joseph Gwilt (8vo, 1826).

VIVES, Juan Luis, a Spanish scholar, born in Valencia in March, 1492, died in Bruges, Flanders, May 6, 1540. He studied in Paris and at the university of Louvain, where he early became professor of belles-lettres. In 1522 he published his commentaries on Augustine's *De Civitate Dei*, and dedicated it to Henry VIII., who thereupon invited him to England, and made him the tutor of his daughter Mary, and subsequently professor at Oxford. He was imprisoned for opposing the divorce of Catharine of Aragon, and on his release settled at Bruges. Budæus, Erasmus, and Vives were called the triumvirs of the republic of letters of the 16th century. His works were collected at Basel (2 vols. fol., 1555) and Valencia (8 vols. fol., 1782–'90). Among the most important are: *De Corruptis Artibus; De Religione;* commentaries on the "Dream of Scipio" and the "Bucolics" of Virgil; and several educational works. His commentary on the "City of God" was placed on the Index because he had given a place in heaven to Numa, Camillus, Cato, Seneca, and other heathens.

VIVIANI, Vincenzo, an Italian mathematician, born in Florence, April 5, 1622, died there, Sept. 22, 1703. He was a pupil of Galileo, then old, blind, and under the ban of the inquisition; and for three years he and Torricelli nursed him, until his death (Jan. 8, 1642). Subsequently he continued to study under the latter. He was admitted to the principal Florentine academies. From 1699 he was a member of the French academy and in the enjoyment of a considerable pension from Louis XIV., which he appropriated to a building in commemoration of Galileo; and in all his works he added to his name "pupil of Galileo." He published numerous mathematical works, but is best known by his restoration of the treatise of Aristæus, *De Locis Solidis*, and of the fifth book of Apollonius of Perga on the conic sections; the latter was entitled *Divinatio in quintum Conicorum Apollonii Pergæi* (1659), and the former *Divinatio in Aristæum* (1701).

VIVISECTION, (Lat. *vivus*, alive, and *sectio*, a cutting), a term used to designate cutting operations performed on living animals for the purpose of acquiring physiological and surgical knowledge, and sometimes also applied to operations in which cutting is not employed. The practice of vivisection dates back to very early periods, and was known in the Alexandrian school. Among the earlier operations which led to positive physiological knowledge may be cited those of Galen, who demonstrated the existence of blood in the arteries by passing two ligatures around an artery in the living animal; but he formed no conception of the manner of communication between the arteries and the veins, and believed that the septum between the ventricles of the heart was perforated by small orifices. Harvey was the first to make any great and conclusive discoveries as the results of experiments on living animals. In studying the movements of the heart, he exposed that organ in the inferior animals through a section made in the walls of the chest. By experiments upon reptiles and fishes he showed that the heart receives its blood from the veins and discharges it into the arteries, a simple ligature to the large venous trunk being sufficient to cut off the supply, and one to the principal artery sufficient to obstruct the passage of the blood and to distend the heart. But although Harvey demonstrated the course of the circulation, it remained for Malpighi in 1661 to actually see the capillary circulation in the lungs of a living frog. It must be admitted that, however minutely the anatomy of the circulatory organs may have been studied upon the dead body, their functions could not have been determined without observing the action of the heart and arteries by exposing them to view in the living animal, and therefore the methods of physical diagnosis, such as auscultation and percussion, could not have been brought to their present state of precision. The question as to the relative time occupied by the auricular and ventricular contractions has only recently been determined by Marey, who constructed a very ingenious and delicate apparatus for registering the form and frequency of the pulse. (See PULSE.) By the use of his apparatus he was enabled to register at the same time the pulsations of the different divisions of the heart, and to determine to the small fraction of a second their duration.—Investigations of quite as important a character as those upon the circulation of the blood have been made for several years upon the various parts of the nervous system. Since all of the vital processes of digestion, assimilation, and consequent nutrition, including also the circulation of the fluids of the body, depend chiefly upon nervous stimuli, and as the various forms of disease are greatly modified by the degree and nature of the nervous force, it becomes a matter of the greatest importance to ascertain the mode of communication which takes place between the different parts of the nervous system and the different organs of the body; and for this purpose the lower animals have been subjected to operations in which sometimes the brain, either entirely or in parts, has been removed, or subjected to the action of stimuli. The diseased condition of various parts of the nervous system which has been found in post-mortem examinations has had its relations to the concomitant disordered conditions of the bodily organs explained, not only by such post-mortem revelations, but by observing the influence which certain produced conditions of the nervous system of the inferior animals have upon the functions of their bodily organs. Much knowledge in regard to the functions of the nervous system has been gained by means of experiments on executed criminals, and on decapitated frogs and other lower animals, in which the exposed nerves were subjected to galvanic and other stimuli. Some of the important discoveries of Sir Charles Bell in regard to the motor and sensory nerves of the spinal cord were made by experiments of this kind; but they lack the conclusiveness of experiments afterward made by Magendie upon living animals, in which the spinal canal was opened, and the cord with the roots of the nerves was exposed.—Vivisection has also afforded means of studying, with important practical results, the action of various forms of electricity on the animal body, and consequently of making an intelligent application of this agent in the treatment of disease. The relations of the production of sugar in the liver to the disease called diabetes mellitus have been determined by examinations of the blood obtained from the portal and hepatic veins in the living animal. The first experiments upon the sugar-forming power of the liver were made by Bernard, and at that time he used a decoction of the organ itself; but as the amount of sugar found in it seemed to depend upon the time after death of making the experiment, sometimes scarcely a trace being found if examined immediately afterward, it was contended by Pavy and others that the sugar was a post-mortem production. But the later experiments of Bernard upon living animals have, as above intimated, demonstrated the existence of a glycogenic function of the liver, by the discovery of sugar in the hepatic vein while there was none furnished to the liver. It has been satisfactorily established by Dr. Austin Flint, jr., by means of vivisections, that the liver, besides being a secretory organ, has also a special excretory function, viz., the elimination from the blood of cholesterine, a constituent of the bile. The same physiologist has also shown that cholesterine is a product of nerve action, its formation by the brain being indicated by comparing the proportion of cholesterine contained in the blood drawn from the carotid arteries of a dog and that contained in blood drawn from the jugular veins. (See "Text Book of Human Physiology," New York, 1876, p. 450.) The excretion of cholesterine by the liver is compared by Flint to that of urea by the kidneys, and he has named that condition of blood poisoning which is the consequence of an abnormal accumulation of cholesterine in the vital fluid "cholesteræmia." (See CHOLESTERINE.) One of the most remarkable operations upon the living animal is the production of artificial diabetes by irritating the nervous substance in the floor of the fourth ventricle of the brain, which was first performed by Bernard. The production of intestinal fistulæ, for the purpose of observing the action of the gastric juice and other digestive fluids upon various kinds of food, has led to the present advanced state of knowledge of the processes of digestion, assimilation, and nutrition. Among other numerous instances of the solution of physiological problems are the discovery of the lacteals and their functions by Asellius in 1622; the practicability of the transfusion of blood by Lower in 1665, and the experiments afterward made upon the subject by Prévost and Dumas, Milne-Edwards, and others in the early part of the present century; also the investigation of the subject of rattlesnake wounds by Dr. S. Weir Mitchell in 1861, and their most appropriate treatment; and the explanation of the pathology and infection of the system by the tapeworm, cysticercus, and trichina spiralis, made by various observers between 1845 and 1860.—There has always been much discussion in regard to the practical importance of vivisection, and the involved questions of wantonness and cruelty, and considerable difference of opinion has existed. A report of the English royal commission (1876) gives a history of the subject, and considers the experiments on living animals under three principal heads, viz.: operations performed for original research or for demonstration to students; the administration of poisons and dangerous drugs, and operations connected therewith; and the artificial production of disease for the purpose of observing its progress and its cure. The commissioners conclude that it is impossible, even if it were desirable, to prevent the practice of making experiments upon living animals, but they recommend the prohibition of its abuse by inhuman or unskilful persons, and of the infliction of unnecessary pain by all; and they furthermore advise the enactment of a law placing vivisection under the control of the secretary of state, giving him power to issue and revoke licenses, and binding the holders of them to conduct their experiments so as to produce as little suffering as possible consistent with the accomplishment of satisfactory results.

VIZAGAPATAM. I. A district of Madras, British India, in the territory formerly known as the Northern Circars, bounded N. E. by Ganjam, E. and S. E. by the bay of Bengal, S. W. by the district of Godavery, and inland by the Jeypoor agency; area, about 9,935 sq. m.; pop. in 1872, 1,832,614. The sea coast is bold and steep, rising into a ridge of rocky hills. The surface is mostly mountainous, and is drained by several small streams. The Eastern Ghauts extend in a N. E. direction along the western boundary. Saltpetre and iron are the chief mineral productions. The climate is warm and damp on the coast, but drier in the interior. The district produces rice, maize, millet, oil seeds, various kinds of pulse, sugar cane, indigo, cotton, and tobacco. The manufactures are few. The French acquired Vizagapatam in 1753, and retained it till 1759, when Clive expelled them. In 1765 the country was ceded by Shah Alum to the British East India company. **II.** A town, capital of the district, at the mouth of a river of the same name, on the W. shore of the bay of Bengal, 380 m. N. E. of Madras; pop. about 40,000. It stands on a small peninsula near a remarkable bold rocky hill about 1,500 ft. in height, called the Dolphin's Nose, is a military station, and has considerable trade.

VIZIER, Vizir, or **Vesir** (Arabic, bearer of a burden), a title given to the ministers of the Ottoman Porte, and other dignitaries. It was formerly applied to the grand vizier and the viziers of the bench, who formed his divan, to the beglerbegs or governors of Roumelia, Anatolia, Damascus, and Cairo, and to the four high judges, the grand equerry, the *sirdar* or field marshal, the chief master of the forests, and others; but its application is now more limited. Viziers are distinguished by a velvet dress, embroidered with gold, pearls, and precious stones, by a turban ornamented with diamonds, and by a standard on the top of which are three horse tails, and which is carried before them. Hence the title pasha of three tails. The grand vizier is the highest officer in the empire, represents the sultan, presides over the divan, commands the centre of the army in battle, and is the only subject who is saluted with the *alkish*, a kind of benediction. He receives from the sultan a seal, on which the name of the monarch is engraved, which he is obliged to wear always on his bosom, and by authority of which he rules. The caliph's lieutenant was called vizier by the Arabs at a very early date; but the first officer of that name in the Turkish empire was Ala ed-Din, who was appointed in 1326 to that position by his brother, the sultan Orkhan. There was originally only one; but the number was afterward increased, so that the prime minister was called *vizir azim*, grand vizier. Mohammed II. had seven viziers, Amurath III. six, and Amurath IV. nine; but from the reign of Ahmed III. only seven could be really called ministers.

VLAARDINGEN, a town of the Netherlands, in the province of South Holland, on the left bank of the New Maas, 6 m. W. of Rotterdam; pop. about 10,000. It has a Reformed and a Catholic church, a good harbor, and nearly 100 registered vessels engaged in the herring fishery. A day of prayer is held on the eve of their annual departure.

VLADIMIR. I. A central government of European Russia, bordering on Yaroslav, Kostroma, Nizhegorod, Tambov, Riazan, Moscow, and Tver; area, 18,862 sq. m.; pop. in 1870, 1,259,923. It consists chiefly of an undulating plain, watered by the Oka, its affluent the Kliasma, and many other rivers, and diversified by forests, heaths, and morasses. There are valuable iron mines. The soil is sterile, and the climate, though healthful, is subject to extremes of heat and cold. Various sorts of grain are raised, as well as hemp, flax, and fruits, but agriculture is of less importance than the manufactures. There are more than 400 establishments, manufacturing cotton, leather, yarn, linen, cloth, silk, iron ware, firearms, glass, hosiery, &c. Ivanovo is called the Russian Manchester. The village of Kholui is the headquarters for painters of saints for the village churches and peasantry. Other important centres of industry are Pistiaki, Shuyah, Pereslavl, and Alexandrov. Suzdal was in the 11th and 12th centuries the capital of a Russian principality, and Murom is next in importance to the capital. **II.** A city, capital of the government, in the district of Suzdal, on the Kliasma, 120 m. E. N. E. of Moscow; pop. in 1867, 15,478. The walls of the kremlin are in decay, and only the cathedral and the church of Maria retain vestiges of the splendor which distinguished this city during its metropolitan era, as the residence of grand dukes from the middle of the 12th till early in the 14th century. It has more than 25 churches, a priests' seminary, a gymnasium, and other schools, and about 20 large manufactories. Trade and industry have greatly increased through the railway traffic with Moscow, Nizhni-Novgorod, and other parts of the empire.

VLADIMIR THE GREAT. See Russia.

VLIESSINGEN, or **Vlissingen.** See Flushing.

VODENA. See Edessa, II.

VOGEL, Eduard, a German traveller, born in Crefeld, Prussia, March 7, 1829, murdered in Africa in 1856. He was the son of the Saxon educator Johann Karl Vogel (1795–1862), studied astronomy at Berlin under Encke, and was attached for two years to Bishop's observatory at Regent's park, London, where he aided Hind in his discoveries. In 1852 he volunteered his services as assistant of Barth, and left London, accompanied by two volunteers from the corps of sappers and miners, in February, 1853, taking with him a full supply of instruments. He reached Moorzook in Fezzan in August, 1853, visited Lake Tchad and proceeded to Kuka, and on Dec. 1, 1854, met Barth at Boondi, 230 m. W. of Kuka. He subsequently visited Yakoba, crossed the Tchadda in April, 1855, and penetrated into the kingdom of Waday, where he was detained for some time, and finally beheaded. In the belief that he might still be alive several expeditions were undertaken in search of him, the most noteworthy of which was that of Von Heuglin in 1860. Some of the travellers perished in the attempt.—See *Erinnerungen an einen Verschollenen* (Leipsic, 1863), by his sister Elise Polko the novelist. (See Polko, Elise.)

VOGT, Karl, a German naturalist, born in Giessen, July 5, 1817, where his father, a well known author of valuable medical works, was a professor in the university. He studied medicine, and in 1839 went to Neufchâtel, where he spent five years in studying natural history with Agassiz and Desor. Of the *Histoire naturelle des poissons d'eau douce*, published by Agassiz, Vogt claims to have written the first volume and most of the second. He wrote *Im Gebirge und auf den Gletschern* (1843); *Physiologische Briefe* (1845); *Lehrbuch der Geologie und Petrifactenkunde* (1846; 3d ed., 1868–'72); *Natürliche Geschichte der Schöpfung des Weltalls* (1851); and *Zoologische Briefe* (1851). In 1847 he became extraordinary professor of natural history at Giessen. In 1848 he engaged with great ardor in the revolutionary agitation which pervaded Germany, was a democratic member of the Frankfort parliament, and lost his professorship and was obliged to leave Germany. Since then he has lived mostly at Bern and Nice. In 1852 he was appointed professor of geology at Geneva, and in 1853 at Bern. In 1856 Prince Napoleon invited him to join his expedition in the northern Atlantic. Among his works, that which has excited the most attention is *Köhlerglaube und Wissenschaft* (1855), which has been widely attacked as atheistic. He has since published *Studien zur gegenwärtigen Lage Europas* (1859); *Die künstliche Fischzucht* (1859; 2d ed., 1875); *Grundriss der Geologie* (1860); *Untersuchungen über die Absonderungen des Harnstoffs* (1861); *Nordfahrt entlang der norwegischen Küste nach dem Nord-Cap* (1863); *Vorlesungen über den Menschen, seine Stellung in der Schöpfung und in der Geschichte der Erde* (1863); *Vorlesungen über nützliche und schädliche, verkannte und verläumdete Thiere* (1864); *Ueber die Mikrocephalen oder Affenmenschen* (1866); *Sechs Vorlesungen über die Darwin'sche Theorie* (1868); and *Politische Briefe an F. Kolb* (1870).

VOGÜÉ, Charles Jean Melchior de, count, a French archæologist, born about 1825. He early explored the East, and published *Les églises de la Terre-Sainte* (1859), *Le temple de Jérusalem* (1864–'5), and *L'architecture civile et religieuse du* I^e *au* VII^e *siècle dans la Syrie centrale* (in 28 numbers, 1865–'8). In 1868 he succeeded the duke de Luynes in the academy of inscriptions and belles-lettres. On Feb. 8, 1871, he was elected to the national assembly for the department of Cher; and on May 22 he was accredited as ambassador at Constantinople, whence in June, 1875, he was transferred to Vienna.

VOICE, the sound produced in the larynx by the vibration of the column of air passing through the *rima glottidis.* The rima glottidis is the narrow elongated slit or chink situated in the larynx and forming the entrance to the trachea and the lungs. Its boundaries on either side are formed posteriorly by the movable arytenoid cartilages, and in its middle and anterior portions by the so-called "vocal chords," two nearly parallel bands of elastic tissue, the anterior extremities of which are attached side by side to the inner surface of the thyroid cartilage, their posterior extremities being attached to the points of the arytenoid cartilage. As the anterior extremities of these bands therefore are fixed in position, while their posterior portions are capable of being separated from or approximated to each other, according to the movements of the arytenoid cartilages, the rima glottidis may thus change alternately its form and size; being expanded into a comparatively wide triangular opening when the arytenoid cartilages and vocal chords are separated from each other, and reduced to the form of a narrow, almost linear slit, when they are closely approximated. By the varying movements of the arytenoid cartilages, the tension of the vocal chords may at the same time be increased or diminished. It is upon these variations in the width of the rima glottidis, and the position and tension of the vocal chords, that the production and modifications of the voice mainly depend.—The first condition of the formation of a vocal sound is the forcible expulsion of air through the larynx. The voice may also be formed imperfectly in inspiration, but only for a short time and with a certain degree of difficulty. The natural time for the continuous production of a vocal sound is during expiration. The chest is first filled with air, and then by its prolonged and steady expulsion, accompanied by the simultaneous action of the laryngeal muscles and the vocal chords, the vocal sound becomes audible. The second condition is that the vocal chords be approximated to a certain extent and thrown into a state of appropriate tension. Even with a forcible expulsion of air, if the rima glottidis be widely open and the chords relaxed, no vocal sound is produced, or at best nothing more than a hoarse whisper, audible only at a short distance. But when the chords are closely approximated and at the same time rendered tense by the action of the laryngeal muscles, their edges are thrown into a state of rapid vibration by the passage of the air, and a vocal sound at once becomes audible. This is readily seen in the larynx of a living animal when exposed to view. It can also be rendered visible in the human subject when the glottis is illuminated by sunlight with the aid of a mirror, placed at the proper angle at the back part of the pharynx, as in the laryngoscope. But the vocal sound is not directly produced by the vibration of the vocal chords. These chords are not, like the strings of a guitar or violin, simply extended between two opposite points and capable of vibrating freely in the interval. On the contrary, they are bands of elastic tissue attached throughout by their external surface, as well as at both ends, to the surrounding tissues, and only projecting inward, as more or less flattened or rounded ridges, at the level of the rima glottidis. In the opinion of some physiologists, it is the thin fold of mucous membrane on the internal surface of the vocal chords which forms the real vibrating edge in the vocal effort, while the chords themselves only constitute the necessary elastic basis for its attachment. Still it is evident that the approximation and elastic tension of the chords supply the primary and essential physical condition for the formation of the voice.—The immediate cause of the production of the vocal sound is the vibration of the column of air itself, while passing out through the rima glottidis. The mechanism of the larynx as a vocal organ, therefore, seems to be analogous to that of a reed instrument, in which a column of air, passing forcibly through a narrow slit, bounded on one or both sides by a thin elastic plate of wood or metal, first causes the edge of the plate to vibrate with a sufficient rapidity, and is thus itself thrown into a state of sonorous vibration. In instruments of this kind, the tone or pitch of the sound produced varies with the length and width of the opening, the size of the vibrating plate, the force of the column of air, and the rapidity of the vibrations. With a wide opening, a large vibrating surface, and a moderately rapid passage of air, the vibrations will be comparatively slow and the sound produced of a deep or grave tone. With a narrow opening and a more rapid current of air, the vibrations will be increased in frequency, and the note produced will be acute or high-pitched. The same thing takes place in the formation of vocal sounds in the larynx. When the vocal chords are only partly approximated, their tension incomplete, and the vibrations allowed to take place along their whole extent, the voice has a grave sound; when they are closely approximated, reducing the rima glottidis to a comparatively short and linear slit, and thrown into a high degree of tension, the voice becomes acute. Every variation between the two extremes of high and low notes is produced in this way, by alterations in the width of the rima glottidis and the length and tension of its vibrating edges. These variations are also aided by changes in the position of the entire larynx; the organ being usually carried downward toward the chest in the production of the lower notes, and upward toward the head in forming the more acute sounds. The character or quality of the voice is also considerably modified by the conditions of tension or relaxation, moisture or dryness of the mucous membrane of the larynx, mouth, and fauces, and the variation in form of the cavities both above and below the glottis; but the actual production of the vocal sound invariably takes place in the larynx, its modifications from the above causes being always secondary. —From what has been said, it is evident that the formation of the voice depends upon the action of the laryngeal muscles, which move the arytenoid cartilages upon their articulations, and thus increase or diminish the width of the rima glottidis and the tension of the vocal chords. These muscles are animated by the recurrent laryngeal nerves, branches of the pneumogastric nerves, which come off from their parent trunks after these have entered the cavity of the chest, and then retrace their course from below upward, through the deeper parts of the neck, until they reach the level of the larynx. Hence their name of "recurrent" laryngeal nerves. If these nerves be divided by an operation, or compressed by an abscess, aneurism, or tumor, so as to interrupt the nervous communication, the voice is enfeebled or lost, according to the degree of injury to the nerve and the consequent paralysis of the laryngeal muscles. The same effect is produced by injury or compression of the pneumogastric nerves in the neck, above the point where their recurrent laryngeal branches are given off. The voice is also affected by inflammation, thickening, ulceration, or submucous infiltration of the tissues of the larynx; all these causes interfering with the necessary action of the laryngeal muscles and the formation of a vibrating fold of mucous membrane at the rima glottidis. There is also a form of hysterical affection in which the power of forming a vocal sound is temporarily lost, owing to a functional disturbance of innervation, and consequent failure of action in the laryngeal muscles. Loss of voice from any of these causes is termed aphonia, and is to be distinguished from aphasia, an affection of different origin, in which the patient retains the power of making a vocal sound, but is unable to remember the appropriate words or phrases necessary to communicate his ideas. (See BRAIN, DISEASES OF THE, vol. iii., p. 203.)

VOITURE, Vincent, a French poet, born in Amiens in 1598, died in or near Paris, May 27, 1648. Though attached to Gaston of Orleans, he was employed in Italy by Richelieu; and under the regency of Anne of Austria he held several sinecures at the court. His passion for gambling and amours involved him in various difficulties. He was a leader in the society of the hôtel Rambouillet, and one of the original members of the French academy. His letters and poems first appeared in 1649, and they are included in the *Collection Charpentier*, with notes by Ubicini (2 vols. 18mo, 1855).

VOLATILE OILS. See ESSENTIAL OILS.

VOLCANO (Lat. *Vulcanus*, the god of fire), an opening in the crust of the earth from which are ejected heated gases, steam, finely divided solid matter resembling ashes, cinders, masses of solid rock intensely heated, and currents of molten rock called lava. These materials in time build up a conical pile, which may attain a height of several thousand feet, forming a volcanic hill or mountain around the opening, and having in its upper part a depression called the crater of the volcano, which communicates with the source of the fiery matters below. The action of certain of these volcanic vents or openings is continuous or nearly so, one or all of the products named being daily ejected, while in others eruptions take place only at rare intervals. Those which are supposed to have ceased to be active are called extinct volcanoes. The name of mud volcanoes is given to openings which through the action of steam or gas throw up a pasty mixture of earth and water unaccompanied by any igneous manifestations. Volcanic vents sometimes appear on high lands, and in this way their cones may be built up on mountains of ordinary rocks, while at other times the whole elevation from the sea level is of volcanic origin. They occasionally break out beneath the sea, forming submarine volcanoes, the matters ejected from which sometimes build up islands. Volcanic activities have been at work on the earth's surface from early geological times; but modern volcanoes are limited to certain regions, generally very distinct from those which were the seats of volcanic energy in past geological periods. On the American continent modern volcanoes are limited to the Pacific slope, along which they may be traced almost continuously from Cape Horn to Alaska. Great numbers of volcanoes occur throughout the Andes, where some attain immense heights, as Cotopaxi in Peru, about 19,500 ft. above the sea (according to Dr. Reiss, who ascended it in 1872). The volcanoes of Central America and of Mexico are numerous and conspicuous, and in California and Oregon we have Shasta, Hood, and St. Helen's, attaining heights of from 11,000 to more than 14,000 ft. Mt. St. Elias, in Alaska, is about 18,000 ft. high. Through the Aleutian islands the belt of volcanoes of western America is connected with those of Kamtchatka, which, with those of the Kuriles, of Japan, and of the Philippines, form interrupted chains of volcanic vents to the burning mountains of the Indian archipelago. In southern continental Europe there are numerous extinct volcanoes; but with the exception of Vesuvius the active vents are now confined to the islands of the Mediterranean. Besides Etna and Stromboli, there are many volcanic islands in the eastern parts of the Mediterranean, while further eastward in continental Asia are lofty volcanic peaks about the Red sea and the Caspian, on the shores of which is Demavend, 20,000 ft. high. Beyond this in the Thian-shan mountains a small volcanic region is said to exist. In Africa there are numerous volcanic vents in the eastern ranges about the equator, besides which a single volcano is known on the western coast at the bight of Benin, near which are also some volcanic islands. In the Atlantic are Jan Mayen and Iceland, remarkable for volcanoes, the volcanic islands of the West Indies, and those of the Azores, Madeira, the Canaries, the Cape Verd islands, St. Helena, and Tristan d'Acunha. There are great numbers of volcanoes throughout the North and South Pacific, the most remarkable of which are those of the Hawaiian islands. Volcanoes occur in New Zealand, in southern Australia, in the Indian ocean, and further south in the Antarctic seas, where remarkable burning mountains have been seen. It is impossible to determine with any degree of accuracy the number of existing volcanic vents. Humboldt fixed it at 407, of which 225 had been active within a century. Of the latter about half were supposed to be upon the Asiatic islands. It has since been estimated that the Indian archipelago alone contains over 900. A noticeable fact in the history of volcanoes is their general linear arrangement, which is particularly conspicuous in the ranges of volcanic islands of eastern Asia and in those of the western part of the American continent, along both shores of the Pacific. It is however to be noticed that the regions bordering on the Atlantic, with the exception of a single point on the coast of Africa, are destitute of volcanic vents, while the seas separating the northern and southern continents abound in them, as seen in the West Indies, the Mediterranean basin, and the Indian archipelago.—Volcanoes differ greatly among themselves, not only in dimensions but in the degree of their activity, the quantity and quality of the materials ejected from them, and the continuous or intermittent character of their action. For more than 2,000 years Stromboli in the Mediterranean has been constantly discharging lava; and Sangai in Peru, 17,000 ft. high, has for 150 years been in continuous action, ejecting every few minutes fiery cinders, with explosions of tremendous violence. In other cases centuries elapse between the eruptions of a volcano. Thus Vesuvius, though built up of volcanic matter, had remained dormant for ages previous to the beginning of our era, when its discharges of lava and ashes buried the cities of Pompeii and Herculaneum. A single eruption of this mountain in 1794 is supposed to have yielded 46,000,000 cubic feet of lava, and one of Etna in 1669 more than twice that amount. The great eruption from the Skapta Jōkull in Iceland, which began in 1783 and continued for two years, gave rise to two lava streams, one 40 and one 50 m. long, with breadths of 7 and 15 m. respectively. A large part of the lava current was 100 ft. thick, and in some of the valleys it attained 600 ft., while its total bulk was estimated at not less than 21 cubic miles. The phenomena of volcanoes may be best understood by considering that they are openings connected with spaces containing molten rock, which is forced upward in the crater by the action of steam or of permanent gases, or in some cases probably by movements of the earth's crust. This material is sometimes in a state of complete fusion like glass, but oftener consists in great part of unmelted grains mingled with a sufficient quantity of liquid matter to give fluidity to the mass. It is moreover charged with water and with various gases, all of which are probably intimately combined with the molten mass under the great pressure which exists below, and in many cases aid materially in giving it fluidity, but, as the lava ascends and the pressure is thus removed, assume the gaseous state and escape. One result of this process appears in the very fluid lava of the great crater of Kilauea in Hawaii, where a surface of molten lava 1,000 ft. in diameter is sometimes seen in active ebullition, rising into jets of great height, while the projected portions harden into a glassy substance. But if, as is generally the case, the lava is in a state of less perfect fusion, it swells up greatly, forming huge bubbles, from the bursting of which the grains of unfused matter which it contains, as well as the interposed liquid portion, are scattered in the shape of ashes or cinders, sometimes with masses of solid unfused rock, often several feet in diameter. These ejections of ignited solid matter are seen in the ordinary eruptions of Vesuvius, and in one instance the fiery cinders from this mountain were estimated to ascend to a height of nearly two miles from the crater. In such cases the lighter material from volcanoes is often borne away by the upper currents of the atmosphere, and may, as is occasionally seen, descend in showers many hundred miles away. The heavier materials fall in the shape of cinders or ashes in the vicinity of the crater, and by their accumulation help to build up the cone. When, as very often happens, there is a precipitation of water due to the condensation of the immense amount of steam given off during the eruption, the wetted cinders constitute a kind of mud called volcanic tufa. Not unfrequently the swelling up within the crater will cause the lava to overflow; or else the pressure of the column of liquid matter may cause a breach in the side of the mountain; in either of which cases a lava current is formed. These currents, as we have seen, are sometimes of great volume, and sheets of such molten rock contribute with the cinders to build up the mountain cone, the two being often interstratified. The fissures in the mountain side resulting from the action of the volcanic forces do not always give rise to lava currents, but may become filled up with the more or less liquid mass. This, hardening within them, gives rise to great walls or dikes of rock, which intersect the beds of lava and of cinders, giving stability to the mass. The surface of the lava stream is rough cinder, light and porous, but at a little depth the lava hardens to a solid rock. The great volcanoes of Hawaii, rising with an average slope of 5° or 6° to heights more than 13,000 ft. above the sea, have been built up mainly of lava. This volcanic region has within the past 40 years been the seat of some of the most stupendous volcanic eruptions on record. The outbursts of lava issue from the volcanic mass at various elevations, from near the summit down almost to the sea level. When lavas break out near the sea or beneath its waters, the action of the water on the molten lava produces a granular and disintegrated material, which like the moistened cinders is known as volcanic tufa, and is sometimes spread out in beds in the sea, or from the action of vapors and gases thrown up into cones of considerable size. Volcanic eruptions are sometimes accompanied or preceded by earthquakes, but great outflows resulting from the rupture and discharge of huge craters filled with lava may take place without any convulsion of the earth.—The gaseous products of volcanoes appear to be chiefly carbonic acid, chlorohydric acid, and sulphur in the forms of sulphuretted hydrogen and sulphurous acid. Combustible gases form at best but an insignificant part of volcanic ejections, and it is doubtful whether the luminous appearances accompanying eruptions, which have given rise to the popular name of burning mountains, are dependent in any degree on combustion. They are most probably due solely to the intense ignition of the ejected matters. How far the movements of the lavas in the craters of volcanoes are dependent on local and external conditions, and how far on deep-seated and occult agencies, is a question. It is by some supposed that the atmospheric waters falling on a volcanic region, and sinking through the soil under the pressure of the column of water above, may penetrate the lavas and become an efficient agent in their elevation in the manner already pointed out; but there is good reason to believe that the force is in many cases far more deeply seated.—The nature of the earthy materials ejected from volcanoes, and their relations to the other rocky matters of the earth's crust, next demand our notice. Setting aside the volcanic ashes and tufas, in which the constituent mineral elements are much disguised, the solidified lavas are conveniently grouped in the two classes of feldspathic or trachytic and augitic or doleritic rocks, according as the minerals feldspar and augite predominate in them. The rocks of the former class are characterized by a comparatively low specific gravity, ordinarily from 2·4 to 2·7, a generally light color, a predominance of silica and alkalies, and a scarcity of iron oxide, lime, and magnesia; while the augitic rocks have a specific gravity of from 2·8 to 3·2, are dark-colored, and contain in abundance the three bases last named. The amount of silica in the latter is generally from 40 to 50 per cent., while in the trachytic rocks it ordinarily ranges from 60 to 70 per cent. The analogies of the feldspathic class are with granitic rocks, into which the trachytes pass by insensible gradations, and they contain as essential elements feldspars allied to orthoclase, sanidine, and albite, sometimes with a little hornblende or mica, and often with an excess of silica over that required to form these minerals, which, instead of being separate in the form of visible quartz as in granite, is intimately blended with the base of the rock. These trachytic rocks are either coarsely crystalline, granular, and friable, or else fine-grained and compact with enclosed feldspar crystals. Dolerite, which may be taken as the most common form of the augitic rocks, consists of a mixture of augite and labradorite, generally with more or less disseminated magnetic or titanic iron. These rocks sometimes occur coarsely granular and crystalline, and at other times fine-grained or compact, constituting basalt. Other feldspars or related minerals, very distinct from those of the trachytic rocks, sometimes replace the labradorite, giving rise to various augitic rocks closely related to dolerite. Two of the most noticeable of these contain the minerals leucite and nepheline in place of labradorite. Olivine or chrysolite, moreover, often forms an important element in these augitic rocks. As all of these minerals, augite included, contain a comparatively large proportion of basic elements, the rocks of this group are often designated "basic" rocks, in contradistinction to which those of the trachytic group, in which silica or silicic acid predominates, are spoken of as "acidic" rocks. The results of the subsequent action of water upon many of these rocks are supposed to have given rise to certain modifications in composition since their ejection. In this way the cells and interstices in the porous lavas have been filled with various hydrated minerals, such as zeolites, calcite, and chlorite, the results of a partial decomposition of the original mineral species. These two great groups and their subordinate varieties may be said to include all the volcanic rocks of both ancient and modern times. Mention should here be made of the vitreous variety known as obsidian, which is a glass generally formed from a trachytic lava, while pumice is a highly inflated or vesicular form of the same. The difference between the crystalline and the vitreous state of rocks is due to the rate of cooling from fusion. The slags resulting from the fusion of the copper slates of Mansfeld in Germany, which closely resemble in composition some doleritic rocks, form a glass when rapidly cooled, and a similar glass may be produced from the melting of basalts; but when slowly cooled the one and the other assume a crystalline structure.—It was formerly supposed that the volcanic rocks of the present day and of the later geological periods differed widely from those of more ancient times; but the results of careful microscopical and chemical study during the past few years go far to show that the constitution of these rocks, even as far back as palæozoic times, is identical with that of recent ones, so that the volcanic activities which in former periods exhibited themselves over different regions of the earth's surface must have presented conditions similar to those of our own time. Although erosion has in most cases effaced the cones of the more ancient volcanoes, yet dikes and sheets of lava and beds of volcanic tufa still remain from remote geological periods. It would appear that some of these former outbursts of igneous rocks were on a grander scale than anything known in the historic period, and differed somewhat in the mode of their eruption. Thus at the beginning of the Cambrian period were poured out the enormous floods of doleritic lavas which, with volcanic tufas and interstratified sandstones, form the copper-bearing or Keweenaw series of Lake Superior, which have a thickness of many thousand feet, and probably once occupied the entire breadth of the lake. Great outbursts both of trachytic and doleritic rocks occurred in the palæozoic in the province of Quebec; and later, in the mesozoic period, were erupted the immense masses of doleritic rocks which along the bay of Fundy, in the valley of the Connecticut, and from the Palisades of the Hudson S. W. through Pennsylvania, are associated with the red sandstones of that period. In the later tertiary time occurred the enormous eruptions which, extending from northern California and Nevada to British Columbia, cover an area of over 200,000 sq. m. with an average thickness of 2,000 ft., and in one place with a thickness of 4,000 ft., consisting of alternate layers of trachytic and doleritic rocks. These great outflows of volcanic material from the lower Cambrian time were on a far more extended scale than any modern eruptions, and probably issued from vast fissures in the earth, due to widespread and deep-seated forces connected with the folding of strata and continental movements.—The hypotheses which have been proposed to explain the origin of volcanoes are manifold, but for the most part can be briefly discussed. That of Davy and Daubeny was based upon the assumption that the earth's interior holds in an unoxidized condition silicon and the metallic bases of the earths and alkalies, which if brought in contact with the water of the ocean would react violently with it, generating a great amount of heat and giving rise to the elements of the silicated minerals which make up the volcanic rocks, at the same time liberating in gaseous compounds the chlorine and the sulphur of the sea salts, together with free hydrogen. These, with aqueous vapors, by their elasticity would rend the earth's crust, and thus account for the mechanical phenomena of earthquakes and volcanoes. This once celebrated hypothesis is now generally rejected as altogether baseless. Others, while rejecting the theory of an unoxidized nucleus, have sought to explain the origin of the volcanic heat by chemical reactions set up in the sedimentary deposits; a view which the study of the thermal relations of chemical change shows to be untenable. Most geologists, adopting the view that the earth was originally in a fused condition, and that the interior is still intensely heated, and probably consists, at least to a great depth, of oxidized mineral matters not very unlike in composition to those at the surface, have sought therein an explanation of volcanic phenomena, though from this point there are several diverging hypotheses. Some have supposed that these materials immediately beneath a crust of no great thickness still remain in a state of igneous fusion, and are arranged in two layers, the lighter of feldspathic matter corresponding to the trachytes, and the heavier and inferior layer having the composition of the dolerites. From these two liquid strata it is imagined that the various volcanic rocks are ejected by movements in the earth's crust, allowing the escape from time to time of portions of the one or the other, or of admixtures of the two; while the intervention of sea water, as already explained, was also possible, giving rise to gaseous products and producing greater or less modifications in the composition of the rocks erupted. Such, in general terms, is the hypothesis adopted by a great many modern geologists, whether they admit the internal fluidity of the earth as a whole, or suppose it, though solid from the centre, to include beneath its surface still unsolidified lakes of molten rock, which may underlie the present volcanic regions. But the supposed separation of the cooling globe into two layers is a gratuitous hypothesis, and there are many chemical reasons for supposing that the upper layer of the earth's surface must have originally had a constitution not far removed from that of the dolerites, and moreover that the materials of the granitic and trachytic rocks were derived from the action of water upon this surface, and are not to be expected among the results of a simple igneous fusion. (See GRANITE.) It is also shown that certain anomalous types of eruptive rocks, which exhibit in their composition pretty wide divergences from both of the types above mentioned, are met with among water-formed rocks, and are doubtless of aqueous origin, as are also some augitic rocks. Another hypothesis in accordance with these facts has therefore been advanced, which is that the source of the volcanic and eruptive rocks of all ages is to be sought in the softening and melting of portions of the solid crust, including both the primitive doleritic layer and the various results of its alteration by aqueous agencies, embracing a great variety of rocks of sedimentary origin. In fact, we find among aqueous crystalline rocks the two types already described as characterizing the igneous masses, and these types have been shown to be the natural results of chemical and mechanical forces always at work at the surface of the latter. The fusion of these and of the various heterogeneous materials which make up the sedimentary deposits, in the presence of the water and saline matters with which the rocks are always impregnated, would seem to explain all the chemical phenomena of volcanicity. The heat necessary to produce this result has been sought for either entirely in that transmitted from the earth's interior to the deeply buried portions of the crust, or in that mechanically evolved by the crushing of the deeply buried strata during the contraction of the earth's crust and the consequent conversion of motion into heat. In reality the two influences must concur in producing this result. In this connection it has been pointed out that the great volcanic regions of modern times, wherever circumstances permit us to determine their geological relations, appear to be those in which have occurred both great deposition of sediments burying to considerable depths the older rocks, and great movements of the earth's crust in comparatively recent geological periods.—See Von Buch, *Physikalische Beschreibung der Canarischer*

Inseln (1825); Daubeny, "The Geology and Chemical Phenomena of Volcanoes" (1824), and "Description of Active and Extinct Volcanoes" (1826; 2d ed., 1848); Scrope, "Considerations on Volcanoes" (1825; enlarged ed., 1862); Sir H. Davy, on the "Phenomena of Volcanoes," in the "Philosophical Transactions" (1828); Lyell, "Principles of Geology" (1830; 11th ed., 1873), and on "Etna" in the "Philosophical Transactions" (1858); Hopkins, "Researches in Physical Geography" (London, 1839–'42; also "Philosophical Transactions," 1839), and "On the Phenomena and Theory of Volcanoes" (report of the British association, 1847); Von Waltershausen, *Atlas des Ætna* (1848–'59); Dana, "Geology of the American Exploring Expedition" (1849); Naumann, *Geognosie* (2 vols., 1850–'53); Phillips, "Vesuvius" (1869); Hunt, "Chemical and Geological Essays" (1875); and Humboldt's "Cosmos," "Travels," and "Treatise on Rocks."

VOLGA (anc. *Rha*), a river of Russia, the longest in Europe. It rises on the plateau of Valdai, in the western part of the government of Tver, near the head waters of the Düna, in lat. 57° N., lon. 33° E., flows a circuitous easterly, and then a southerly and southeasterly course, passing by the towns of Tver, Yaroslav, Kostroma, Nizhni Novgorod, Kazan, Simbirsk, Samara, Saratov, and Astrakhan, capitals of the governments of the same names, and near the last named town falls into the Caspian sea by a great number of mouths. Its length is about 2,300 m., and its total fall is little more than 600 ft. Its basin is estimated at upward of 500,000 sq. m. Its principal affluents from the right are the Oka and the Sura, and from the left the Tvertza, Mologa, Kostroma, Unsha, Vetluga, Kama, Samara, and Irgis. Numerous canals connect it with the Baltic and White seas, making it the great artery of communication for European Russia, though its navigation is frequently interrupted by sand banks and changes of channel, and obstructed by ice during half of the year. It abounds in fish, including salmon and sturgeon, which are largely exported.

VOLHYNIA (Pol. *Wołyń*), a government of West Russia, formerly a province of Poland, bordering on the governments of Lublin, Grodno, Minsk, Kiev, and Podolia, and on the Austrian province of Galicia; area, 27,738 sq. m.; pop. in 1870, 1,704,018, including about 200,000 Jews. The surface in general is level or undulating, and diversified in some places by hills covered with pine forests, and in the north with peat moors and morasses. In the south some low offsets of the Carpathian range enter the government from Podolia. There are no large rivers; the Bug forms the W. boundary, and the principal other streams are the Styr and Goryn. The soil is extremely rich, and there is no other part of the empire where agriculture is so flourishing. The chief productions are grain, hemp, flax, linseed, hempseed, hops, tobacco, and live stock. Bog iron, saltpetre, building stone, millstone, limestone, porcelain clay, and potters' clay are the most important minerals. The manufactures are increasing in importance, and include iron, leather, glass, earthenware, paper, beet sugar, cloth, potash, tar, and charcoal. The principal towns are Zhitomir, the capital, Staro-Konstantinov, Kremenetz, Ostrog, and Dubno.

VOLKMANN, Alfred Wilhelm, a German physiologist, born in Leipsic, July 1, 1801, died April 21, 1877. He graduated in medicine at Leipsic in 1826, became extraordinary professor there in 1834, and in 1837 professor of physiology at Dorpat. In 1843 he received the same chair at Halle, and afterward also that of anatomy. His works include *Anatomia Animalium* (Leipsic, 1831–'3); *Neue Beiträge zur Physiologie des Gesichtssinnes* (1836); *Die Lehre vom leiblichen Leben* (1837); *Die Selbständigkeit des sympathetischen Nervensystems*, jointly with F. H. Bidder (1842); and *Physiologische Untersuchungen im Gebiete der Optik* (1863–'4).

VOLNEY, Constantin François Chassebœuf, count de, a French author, born at Craon in Anjou, Feb. 3, 1757, died in Paris, April 25, 1820. His family name was Chassebœuf, but his father gave him that of Boisgirais, which he himself changed to Volney. A large fortune inherited from his mother was increased in 1781 by a considerable legacy, and, after studying medicine and oriental languages in Paris, he spent several years in Egypt and Syria, and several months in a convent of the Lebanon. After his return he was appointed director general of agriculture and commerce in Corsica. In 1789 he was elected to the states general for Anjou, and at the close of the constituent assembly in 1791 returned to Corsica, where he became acquainted with Napoleon Bonaparte. In 1793–'4 he was imprisoned for ten months as a Girondist, and in 1794 was appointed professor of history in the normal school. In 1795 he went to the United States, where he had a controversy with Priestley in regard to his work *Les ruines*, and his answer to Priestley's pamphlet on infidelity appeared in an English translation (Philadelphia, 1797). In 1798 he returned to France. He accepted the revolution of the 18th Brumaire as an antidote against anarchy, and was appointed a senator, but declined the ministry of the interior. On the establishment of the empire he withdrew from the senate, but his resignation was not accepted. Napoleon made him a count in 1808, and Louis XVIII. a peer in June, 1814. His works include *Sur la chronologie d'Hérodote* (Paris, 1781); *Voyage en Égypte et en Syrie* (2 vols., 1787; English translation, London, 1787); *Les ruines, ou méditations sur les révolutions des empires* (1791, often reprinted; English translation, New York, 1796; London, 1827, comprising a translation of *La loi naturelle*), in which he first avowed those infidel opinions for which he is now chiefly known; *Leçons d'histoire* (1799; new ed., 1822); *Tableau du climat et du sol des États-Unis d'Amérique* (2 vols., 1803; translated by C. B. Brown, Philadelphia, 1804); *Recherches nouvelles sur l'histoire ancienne* (3 vols., revised and enlarged ed., 1814–'15; translated by Col. Corbet, 2 vols., London, 1819); *L'alphabet européen appliqué aux langues asiatiques* (1819); and *Histoire de Samuel, inventeur du sacre des rois* (1819). His complete works (8 vols., Paris, 1820–'26) were edited by Ad. Bossange, with a biography. A select edition appeared in 1846.—See *Études sur Volney*, by Eugène Berger (Paris, 1852).

VOLOGDA. **I.** A N. government of European Russia, bordering on Olonetz, Archangel, Tobolsk (from which it is separated by the Ural mountains), Perm, Viatka, Kostroma, Yaroslav, and Novgorod; area, 155,498 sq. m.; pop. in 1870, 1,003,039. The surface, stretching across more than half the breadth of northern Russia, is an undulating plain, mostly covered with woods, marshes, and sands, except in the east, where it is traversed by offshoots of the Ural. It contains Lake Kubinskoye in the west, and is watered by the Petchora, Mezen, Dwina, Sukhona, Vitchegda, and Pinega, tributaries of the Arctic ocean or of the White sea. The climate is very severe, and only a small portion of the soil is cultivated, producing chiefly rye, barley, hemp, flax, and pulse. The chief mineral products are iron, copper, salt, granite, and marble. Horses and cattle are reared, and bears, wolves, and deer are hunted. The inhabitants consist of Russians, Voguls, Samoyeds, and some other tribes, many of them uncivilized. The exports comprise furs, timber, turpentine, and pitch. The chief towns besides the capital are Ustiug Velikoi and Totma. **II.** A city, capital of the government, on the Vologda, a tributary of the Sukhona, about 340 m. E. S. E. of St. Petersburg; pop. in 1867, 17,859. It has more than 50 churches, a priests' seminary, a gymnasium, and other schools, and 40 manufactories, chiefly of tallow, soap, crystal, glass, leather, and linen. In the 13th century it became part of the republic of Novgorod, and was a centre of trade with Asia. English merchants were established here in the 16th century, and previous to the conquest of the Baltic ports Vologda was the great emporium for traffic. The trade is still active, though less important than formerly. Offenders were banished to Vologda until it was superseded by Siberia as a place of exile, and it is still occasionally assigned as a residence to persons expelled from the capital.

VOLSCI, an ancient people of central Italy, according to their language akin to the Umbrians. They inhabited the southern part of Latium, extending E. beyond the Liris (Garigliano) and W. to the Tyrrhenian sea, on the shore of which their capital, Antium, formed a considerable seaport (now Porto d'Anzo). They were engaged in continual hostilities with Rome, until they were subdued in 338 by L. Furius Camillus, when they disappeared.

VOLSINII. See Bolsena.

VOLTA, Alessandro, an Italian physicist, born in Como, Feb. 18, 1745, died there, April 5, 1827. He belonged to a noble family, and early studied electrical phenomena. In 1774 he became rector of the gymnasium and professor of physics in Como, and a few years later was transferred to the university of Pavia. In 1775 he constructed the *electrophorus*, consisting of two circular plates of metal having between them a plate of resin; and to improve it, he invented in 1782 the electrical condenser, by which small charges of electricity were accumulated until they reached a considerable amount. In the course of his investigations he constructed the electrical pistol, the eudiometer for testing the amount of oxygen in the air, and the lamp with inflammable air. But his reputation rests upon his discovery in 1799 of the instrument now known as the voltaic pile. (See Animal Electricity, and Galvanism.) In 1782 Volta travelled in Germany, Holland, England, and France, and he is said to have introduced from Savoy into Lombardy the culture of the potato. In 1796 he was one of the deputies sent by the citizens of Pavia to solicit the protection of Bonaparte, who treated him with the highest honor, and when first consul invited him to Paris to make experiments with his pile. In 1802 he was chosen a member of the French institute, was afterward delegate of the university of Pavia to the congress of Lyons, and was created by Napoleon count and senator of the kingdom of Italy. In 1804 he resigned his professorship and retired to Como, and in 1815 received from the emperor Francis the appointment of director of the philosophical faculty in the university of Pavia. Antinori superintended an edition of his works (5 vols., Florence, 1826).—See Mocchetti, *Vita del conte Volta* (Como, 1838).

VOLTAIRE, François Marie Arouet de, a French author, born in Paris, Nov. 21, 1694, died there, May 30, 1778. His parents were the sieur Arouet, treasurer in the chamber of accounts, and Marie Catharine d'Aumart, of a noble family of Poitou. The name Voltaire is said by some to have been derived from a family estate that belonged to the mother, while others consider it an anagram of Arouet *l. i.* (*le jeune*). His godfather, a certain abbé de Châteauneuf, was his first teacher, and indoctrinated him in the lively but skeptical literature of the day. The child was taught to read in the *Mosaïde*, a poem in which Moses is described as an impostor, ascribed to Jean Baptiste Rousseau. His first verses, written in his 12th year, addressed to the dauphin and soliciting alms for an invalid, attracted the attention of Ninon de l'Enclos, who bequeathed him 2,000 francs for the purchase of books. At the college of Louis-le-Grand the Jesuits soon discovered both his extraordinary talents and the freedom of mind which induced one of them to predict that he would one day become the coryphæus of deism. On his departure from college, the boy was placed in a school of jurisprudence, with a view to the subsequent purchase of a judicial office; but he preferred poetry to law. Besides, the abbé de Châteauneuf had introduced him to the brilliant and licentious society of his mistress Ninon, which already reacted against the asceticism of Mme. de Maintenon, and indulged in railleries against all established institutions, religious, political, and social. His law studies were of course interrupted, and this fact, together with the composition of a poem in 1712 on the decoration of the choir of Notre Dame, led his father to connect him with the embassy of the marquis de Châteauneuf to the United Provinces. At the Hague one Mme. Dunoyer accused him of seducing her daughter, though she was herself suspected of having favored the crime, and from a mercenary motive published their correspondence. This scandal obliged him to return to Paris, and his father pardoned him only on condition that he should resume his studies with a notary. A friend of the family, M. de Caumartin, procured permission for him to pass a few months in his country residence at St. Ange. On his return to Paris he was suddenly and strangely arrested and transferred to the Bastile. Louis XIV. had just died; satirical and witty pamphlets celebrated the event as a happy deliverance; and some of the lampoons or epigrams being ascribed to Voltaire, though he was barely 20 years of age, the regent issued orders for his confinement. During the year he spent in prison he wrote a part of his epic the *Henriade*, and completed a tragedy, begun some years before, entitled *Œdipe*. Pleased with these performances, the regent released him, and added to the favor a considerable donation. *Œdipe* was soon afterward (1718) produced on the stage with brilliant success, and even his father became reconciled to his literary career. The play abounded in impressive scenes, lofty characters, and a most fervid and beautiful declamation; it has since kept possession of the stage, but is rather a series of impassioned and eloquent dialogues than a drama. Voltaire now passed from château to château, to visit illustrious friends; he studied at Amsterdam, passed some time at Brussels, and sought out Jean Baptiste Rousseau in his place of exile. Yet in the midst of these diversions he composed two new tragedies, *Artémire* and *Mariamne*, and a comedy, *L'indiscret*, and completed the *Henriade*. The tragedies met with indifferent success in the representation, and the comedy was a failure. But his epic, suggested by the reign of Henry IV., having been purloined, altered, and published under the title of *La ligue*, by a copyist named Desfontaines, became rapidly popular. The sensation it produced, even in the mutilated and factitious form in which it had been given to the public, compelled the author to hasten his own final revisions. Certain bold sentiments of philosophy and tolerance, however, scattered among the poetic beauties, aroused the suspicions of the clergy, and he could not procure the license for printing. Though he offered to dedicate the poem to the king, the obstacles put in the way of its appearance were found nearly insuperable. While he was yet struggling to remove them, an incident occurred which suddenly changed the tenor of his life. At the table of the duke de Sully he took part in a discussion in a manner too free and spirited, and formally contradicted a chevalier Rohan-Chabot, who received the impertinence in high dudgeon. "Who is this," asked the chevalier, warmly, "that presumes to talk so loud?" "A young man," replied Voltaire, "who does not bear a high name, but who is capable of honoring that which he bears." As the name of the chevalier was his principal distinction, he felt the sly reproof, and some days afterward caused his lackeys to call Voltaire from the duke's dinner table and administer a severe chastisement with rods. Voltaire appealed to the duke to resent the indignity, but in vain. He now practised fencing day and night, and when he thought himself sufficiently apt he challenged his assailant. The relatives of the latter procured a royal order for Voltaire's imprisonment in the Bastile. At the end of six months he was set free, but on the condition that he should quit France. He went to England (1726), and resided there three years. Lord Bolingbroke introduced him into that society of freethinkers which was then the reigning school of literature. His first and most novel impressions were derived from the great spectacle presented by the enormous activity and orderly freedom of England. Next to this and his intercourse with the polished freethinkers, he was chiefly interested in the physical philosophy which, under the teachings of Newton, was pushing the antiquarian, scholastic, and moral sciences into the shade, and became an earnest student of mathematics, astronomy, and the experimental branches of knowledge. He saw in these not so much the comprehensive truths as the instrumentalities they furnished for assailing the moral systems of the Jesuits and other religionists. From his youth Voltaire had made war, more or less open, upon the prevailing tenets. The brothers Walpole persuaded George II. and his ministers to head the subscription for a splendid impression of the *Henriade*, and the whole aristocratic society followed in their wake. Voltaire rose speedily to the summit of renown as an epic poet, and when he returned to France he found himself a national idol. His admiration of the English and their polity he described shortly after his return (1729) in his *Lettres sur les Anglais*. He made a considerable fortune by investing his literary gains in lotteries, in speculations, and in mercantile adventures to the coast of Africa. He next wrote the tragedy of *Brutus*, which was not a success that satisfied his ambition or vanity. Fontenelle and La Motte advised him to give up tragedy, and he replied with *Zaïre* (1730), which, though written in 22 days, was his best and most pathetic drama, and was received with unbounded applause. Even in these poetic attempts he could not suppress an occasional inkling of his deistical and liberal principles. His *Lettres* were consequently ordered to be publicly burned, and he himself escaped *lettres de cachet* only by a speedy retreat to Cirey, near Vassy in Champagne. This was the château of the marchioness du Châtelet, who was celebrated for her love of mathematics and abstruse sciences, and read Leibnitz and Newton in the original Latin. During his long residence under the same roof with Mme. du Châtelet, a connection which Lord Brougham defends as entirely Platonic, he wrote his *Élémens de la philosophie de Newton*, and a treatise on fire. Other fruits of his activity at this time were his *Alzire* (1736), *Mahomet* (1741), dedicated to the pope, *Mérope* (1743), and a multitude of lighter pieces, including *La pucelle*, a disgustingly ribald performance. He also labored upon his most important work, the *Essai sur les mœurs et sur l'esprit des nations;* collected materials for his *Siècle de Louis Quatorze;* and amused his leisure in the production of plays for a private theatre, which he built and managed. Voltaire's residence at Cirey was marked by the opening of his correspondence with the prince royal of Prussia, afterward Frederick the Great. It was begun by the prince, who admired both his genius and the audacity with which he had assailed the government and clergy of France. Voltaire expressed the highest admiration of the prince, whom he pronounced a Trajan and Pliny combined. When Frederick succeeded to the throne he asked Voltaire to reside at his court (1740). The poet declined at first, preferring the society of Mme. du Châtelet; but after her death (1749) he was more inclined to accept the invitation. He had lived altogether 13 years at Cirey; yet he did not spend the whole of his time there. Many visits were made by him, generally in company with the marchioness, to different towns. In 1736 the scandal occasioned by his *Mondain* compelled him to retire to Brussels. Twice he went to Berlin, once in 1740 to see Frederick, and again in 1744, on a political mission for preserving the peace of Europe, with which he had been charged by the French cabinet. For a while also, in 1746, he removed to Paris, where he wrote and brought out other tragedies, trained Le Kain in the dramatic art, was chosen a member of the French academy, and received the appointment of historiographer of France from Louis XV. But his cynicism displeased Mme. de Pompadour, and the Jesuits always worked against him. Crébillon was set up as a rival author; the court adopted the new favorite, and Voltaire quitted Paris for Berlin. Frederick received him with transports of joy (1750). He was lodged in the apartments of Marshal Saxe; the king's cooks, servants, and horses were placed at his disposal; he was granted a pension of 20,000 francs, and he and the king studied together for two hours a day, while he was welcomed to the king's table in the evening. Voltaire completed his *Siècle de Louis Quatorze*, and Frederick wrote verses and essays which he submitted to the criticism of the poet. But both were imperious, both irritable, both witty, while the one was a king and the other only a poet. Distrusts soon arose, bickerings followed, and in the end there was a violent rupture. Other favorites, Maupertuis, a philosopher, whom Voltaire lampooned under the name of Dr. Akakia, and Lamettre, a physician, widened the breach. At length Voltaire resolved to escape, and, carrying some of the king's poems with him, he was arrested at Frankfort under circumstances of considerable annoyance and disgrace (1753). The indignant poet abused the monarch afterward as freely as he had once flattered him. Yet their correspondence was subsequently renewed, and though they criticised each other severely for the past, they resumed many of their old reciprocal flatteries. In 1755 Voltaire purchased an estate near Geneva, in Switzerland, which he called Les Délices, and there prosecuted once more his literary projects. But he became involved in disputes with his more rigid Swiss neighbors; the publication of *La pucelle* created many enemies; and forged verses in ridicule of Louis XV. and Mme. de Pompadour ascribed to him started new rumors of *lettres de cachet*. Throughout his life he was more or less involved in petulant controversies with contemptible writers. With Jean Jacques Rousseau he tried in vain to maintain a friendship. Voltaire had never restrained in private the mockeries and jests for which the personal oddities and speculative absurdities of Rousseau gave occasion; and these, coming to the ear of their object, provoked recrimination and a final rupture. In 1762 he removed to an estate which he had purchased at Ferney, on French territory, but near the Swiss confines, so that he might easily escape from one country to the other in the event of hostilities on the part of either. His books and his speculations in the funds had made him enormously rich, and he delighted in spending his fortune in the improvement of his property, in constructing better habitations for the poor laborers, in befriending indigent literary men, and in entertaining the hosts of visitors attracted by his fame. Nothing gave him greater celebrity than his efforts in behalf of oppressed Protestants. Fugitives from the civil troubles of Geneva and other towns always found an asylum beneath his roof. He even built a church at Ferney, which he dedicated to God, but which the ecclesiastical authority refused to recognize and consecrate. He omitted no exertion to maintain his place and continue the inspiration which he had given to the literature of his age. He had become, in a sense, the founder of a new sect of thinkers and writers, who took the name of the encyclopædists, and who, differing from him in many particulars, were yet glad to be sheltered under the auspices of his fame. The idea of the great work, the *Encyclopédie*, in which this school embodied its schemes, was a substantial exposition of everything which human genius had conceived or created since the beginning of society. (See CYCLOPÆDIA, and DIDEROT.) Voltaire was a decided theist, and he rebuked the philosophy of his age, which tried to banish God from the universe. In his 84th year he visited Paris, whither he carried a new tragedy, *Irène*, and was received by all classes with unparalleled demonstrations of honor. His carriage was drawn by the people; his rooms were crowded with the grandees of politics, society, and letters, from morning to night; and his visits to the theatres were ovations, in which he was crowned with laurels and roses, and all the arts conspired to do him homage. Among his latest words were these: "I die worshipping God, loving my friends, not hating my enemies, but detesting superstition." Impediments were raised by the French clergy to his decent burial in the parish where he expired, and his remains were carried to the abbey of Scellières, belonging to one of his nephews, where he was interred. On the stone his friends placed the simple inscription: *Ci-gît Voltaire.* The government ordered the newspapers not to comment upon his death; but Frederick of Prussia caused the Berlin academy to do honor to his memory, and Catharine II. of Russia, with whom he had long corresponded, openly mourned the event.—As for the character of Voltaire, it will be, as it long has been, variously judged. His literary merits admit of less doubt, and posterity has confirmed the sentiment of his contemporaries, that he was the sovereign writer of his century. No other writer controlled so completely the opinions of the world. Yet he was not a great thinker, not a great poet, not a great historian, not a great novelist, and not a great manager or man of action. Of his 28 or 30 dramatic pieces, scarcely one rises to the highest line of dramatic art; his comedies, like his epics, are no longer read; his histories are sprightly and entertaining, but not authentic; and his essays, both in prose and verse, with perhaps the single exception of his historical disquisitions, have ceased to instruct. For the secret of his success we must turn to those satires, tales, *vers de société*, madrigals, letters, and epigrams, in which the whole spirit of the age saw itself expressed with inimitable vivacity, grace, point, and agreeableness. He was there the master of all styles, save, in his own phrase, of the *ennuyeux* or dull and wearisome. In delicate derision and irony he never had an equal; his understanding was clear and piercing, and perhaps the most dexterous that ever was created; his judgment, though not profound or solid, was remarkable for good sense; his wit was brilliant, glancing, and keen as a flash, and his fancy lively and inexhaustible. His principal works besides those already mentioned are: *Histoire de Charles XII., roi de Suède* (1730); *Le temple du goût* (1733), a critical and satirical production, half prose and half verse; seven *Discours sur l'homme*, imitated from Pope; *Le dictionnaire philosophique; Histoire de la Russie sous Pierre le Grand; Histoire du parlement; Philosophie de l'histoire; La Bible commentée;* and *Histoire de l'établissement du Christianisme.* Of the numerous editions of his works, the best probably are those by Beuchot (70 vols. 8vo, 1829–'34) and Louis Barré (20 vols., 1856–'9). Among the best lives of Voltaire are those of Cordorcet (1787), Mazure (1821), and Longchamps and Wagnière (2 vols. 8vo, Paris, 1825). See also *Voltaire*, by David Friedrich Strauss (1870; 3d ed., 1872); "Voltaire," by John Morley (London, 1871); and *Voltaire et la société du XVIII^e siècle*, by T. G. Desnoiresterres (8 vols., 1855–'76).

VOLTERRA (anc. *Volaterræ*), a town of Tuscany, Italy, in the province of Pisa, on an elevated plateau between the Era on the north and the Cecina on the south, 30 m. S. W. of Florence; pop. about 6,000. It retains more of its original Etruscan character than any other Italian city. It is the seat of a bishop and of a college and episcopal seminary, and has a remarkable cathedral, the sacristy of which is especially rich in relics, and many other interesting churches and palaces. In the vicinity are salt and borax springs, salines, coal mines, and quarries of marble, gypsum, and alabaster, the last being largely manufactured. The old citadel contains the dungeon, *il mastio di Volterra*, where the mathematician Lorenzini and others were incarcerated, and the whole building is now used as a prison.—Volaterræ was one of the oldest and most important of the Etruscan cities. It adhered to the Latins in their war with Tarquinius Priscus, resisted L. Cornelius Scipio Barbatus in the beginning of the 3d century B. C., and subsequently in the same century became a dependent ally of Rome. It was the last stronghold of Marius in Italy, and did not surrender to the troops of Sulla till after a two years' siege. Its inhabitants received the rights of Roman citizens, and were protected by Cicero from the effort made during his consulship to dispossess them of their territory by an agrarian law. There are no allusions to it in the history of the Roman empire, but after the fall of the western empire it again came into notice as a stronghold in the wars of the Goths with Narses. Of the ruins and antiquities of the city, the most remarkable are two of the ancient gates, one, the Porta all' Arco, retaining perfect its sculptured arch.

VOLTERRA, Daniele da, an Italian painter, whose real name was Ricciarelli, born in Volterra in 1509, died in Rome about 1566. He studied under Sodoma in Volterra, Baldassare

Peruzzi in Siena, and Perino del Vaga in Rome. He assisted the last in various works, and succeeded him as superintendent of those for the Vatican. He was a friend and follower of Michel Angelo, under whose influence he executed his fresco of the "Descent from the Cross" in the church of Trinità de' Monti, a classical work which ranked next to Raphael's "Transfiguration" and Domenichino's "St. Jerome." Among the finest of his other works is the "Massacre of the Innocents" in Florence. On the death of Paul III. in 1549 he lost his office, and turned his attention to sculpture. At the request of Paul IV. he covered with garments some of the nude figures of Michel Angelo's "Last Judgment," and was nicknamed "maker of breeches" (*brachettone*).

VOLTURNO (anc. *Vulturnus*), a river of S. Italy, in Campania, which rises near Monte Meta, midway between Gaëta and Naples, flows S. E. and W., and falls into the gulf of Gaëta, an arm of the Mediterranean, after a course of 90 m. At the beginning of October, 1860, an important victory over the troops of the king of Naples was achieved by Garibaldi on the banks of the Volturno.

VOLUNTEER, one who engages in any service of his own accord, particularly one who in time of war offers his services to his country and becomes subject to military discipline and service. The term is also applied to those who offer in a forlorn hope, as it is called, to storm a work, or engage in any enterprise of peculiar danger. In Great Britain the volunteer corps is a reserve force of the army, available for home defence in case of invasion. In 1803, under fear of a French invasion, there were 400,000 volunteers. In 1859, when France menaced England, the corps rose from 15,000 to 150,000 men. The present system began in 1857 with one corps in London and one in Devonshire. In 1871, 211,000 volunteers cost the state £495,225, of which £142,612 was for instruction, arms, accoutrements, and camp equipage. The estimates of 1875-'6 appropriate £437,248 for a force of 1,407 officers and 161,150 men. The capitation grant of volunteers is 20 shillings, of officers and sergeant instructors 30 shillings.—In the United States there were 70,000 volunteers for the Mexican war (1846-'7), and in the civil war (1861-'5), out of over two million soldiers, all but about 50,000 were volunteers.

VOLUSIA, an E. county of Florida, bordering on the Atlantic, and bounded W. by the St. John's river; area, 2,196 sq. m.; pop. in 1870, 1,723, of whom 328 were colored. The surface is generally level, and in some parts flat and swampy. The chief productions in 1870 were 14,220 bushels of Indian corn, 3,093 of peas and beans, 15,417 of sweet potatoes, and 134 bales of cotton. There were 186 horses, 3,102 milch cows, 7,228 other cattle, 107 sheep, and 4,014 swine. Capital, Enterprise.

VOMITING, the act of rejecting the contents of the stomach, due in great part to the contraction of the abdominal muscles, assisted by the active coöperation of the muscular walls of the organ; the diaphragm remains fixed, affording a firm surface against which the stomach is pressed by the abdominal muscles. Relaxation of the sphincter at the cardiac orifice of the stomach is necessary, as its contraction will resist the power of all the expulsor muscles combined, explaining the violent and vain efforts to vomit which all must have seen or experienced; the act is preceded by a deep inspiration, the glottis being spasmodically closed during the paroxysm. It may be produced by irritating substances applied to the mucous membrane of the stomach, the impression being conveyed by the pneumogastric nerves and the motor nerves of expiration, as with common emetics; by irritations in other parts of the body, transmitted by reflex nervous action, as in strangulated hernia, the passage of calculi, and during gestation; and by impressions received through the sensorial centres, whether emotional or sensational, as from tickling the fauces, disgusting sights or odors, and in sea sickness; even the recollection of these sensations may cause vomiting in very impressionable persons. It is a common symptom of many diseases of the stomach and intestines, and arises from sympathy in affections of many other organs; it is sometimes nervous or spasmodic. Vomiting usually acts as its own remedy, the expulsion of the irritating contents of the stomach, when complete, being as a general rule sufficient to relieve the system from any further disturbance. When due to other causes, as for example sea sickness, early pregnancy, &c., it is also for the most part temporary, and subsides spontaneously after a certain period. When long continued and obstinate, or unusually violent, it may require the use of special remedies, such as bits of ice held in the mouth and slowly swallowed, small doses of chloroform or hydrocyanic acid, or the application of sinapisms or blisters to the epigastrium.

VONDEL, Joost van den, a Dutch poet, born in Cologne, Nov. 17, 1587, died in 1679. His parents were Anabaptists, and in his childhood settled in Amsterdam. He joined the Arminians, and finally the Roman Catholics. He was the most celebrated Dutch poet and dramatist of the 17th century. His works include metrical translations of the Psalms, of Virgil, and of Ovid, and satires and tragedies, forming 21 volumes in the best edition (Amsterdam, 1820). His most celebrated plays are *Gijsbrecht van Amstel*, *Lucifer*, and *Palamedes.* The last, alluding to Barneveldt and his murder, though not published till 1625, after the death of Prince Maurice, was adjudged treasonable and libellous. Vondel's life was written by Camper (1818) and Zeeman (1831).

VORARLBERG, the westernmost district of the Austrian empire, officially united with Tyrol, bounded N. and N. E. by Bavaria, E. by Tyrol, S. by the Swiss canton of Grisons, W. by the principality of Liechtenstein and the

Swiss canton of St. Gall, and N. W. by the lake of Constance; area, 1,005 sq. m.; pop. in 1870, 102,264, almost all Germans and Catholics. It receives its name from a mountain ridge called the Arlberg, a branch of the Alps. It is watered by the Aach, Ill, Fussach, and Lech; produces potatoes, fruits, wine, grain, and much cheese; and has mines of iron. Many of the people are employed in spring and summer as builders and masons in Switzerland and France, and as herdsmen in Swabia and Bavaria. The principal towns are Bregenz, the capital, Feldkirch, and Bludenz. Vorarlberg has a separate diet and constitution, but is under the administration of the governor of Tyrol.

VORONEZH. I. A S. government of Russia, bordering on Orel, Tambov, Saratov, the country of the Don Cossacks, Kharkov, and Kursk; area, 25,437 sq. m.; pop. in 1870, 2,152,696. The surface is undulating, with a few ridges of slight elevation, and a general slope southward. It is drained by the Don and its tributaries, the Sosna, the Voronezh, and the Bityug, and the Khoper. The principal mineral productions are iron, saltpetre, limestone, and sandstone. The climate is good, but the winters are severe. The soil is extremely fertile, and the government is one of the most productive agricultural regions of the empire; wheat is the principal crop. The horses are generally of superior breed, and many of them are trained for hunting. The rearing of bees is extensively practised, and honey is an important article of export. Coarse cloths, iron ware, soap, tallow, and beet sugar are manufactured. The exports include timber, grain, horses, oxen, wool, hides, and fruits. **II.** A city, capital of the government, on the Voronezh, near its confluence with the Don, 130 m. E. of Kursk; pop. in 1867, 41,592. It is built on a steep hill, and has a strong position. It consists of an upper and lower town, with extensive suburbs. There are over 20 churches, several convents and hospitals, a military and a naval orphan asylum, a gymnasium, and a school of cadets. The manufactures comprise cloth, soap, tallow, leather, and vitriol. The town has a large commerce by way of the Don, especially in the grain and tallow trade. Peter the Great founded a palace here, and erected extensive dockyards and arsenals for the construction of a navy on the sea of Azov; but most of these establishments were removed to Tavrov, in the same government, and Rostov, and the palace has been burned.

VORONTZOFF. I. Mikhail, count, a Russian statesman, born in 1710, died in Moscow in 1767. He was descended from Gabriel Vorontzoff, who fell in 1678 at the siege of Tchigrin, Little Russia. He became a lover of the empress Elizabeth, who arranged a marriage for him with her cousin, a niece of Catharine I., and in 1744 she made him vice chancellor and minister of foreign affairs. The emperor Charles VII. made him and two of his brothers counts of the German empire. He negotiated important treaties, and finally became chancellor, but lost his influence under Catharine II. **II. Mikhail,** a Russian soldier, born in St. Petersburg in May, 1782, died in Odessa in November, 1856. He was a son of Count Simon Vorontzoff, ambassador in London, and his sister married in 1808 the earl of Pembroke, father of Sidney Herbert. He early fought in the Caucasus and against the Turks, distinguished himself in the campaigns against Napoleon, and was wounded at Borodino. Subsequently he commanded the Russian contingent in France. In 1823 he became governor general of New (South) Russia and Bessarabia, in 1826 coöperated with Ribeaupierre in the treaty of Akerman, and in 1828 replaced Menshikoff, who had been wounded at the siege of Varna. In 1844 he was appointed governor of the Caucasus, and in 1845 penetrated to Dargo, Shamyl's stronghold, and pushed operations against him, though Shamyl held out till 1859. While his command obtained several advantages in the eastern war of 1853, he was himself disabled by ill health, which in October, 1854, prompted his withdrawal. In 1856, at the coronation of Alexander II., he received the title of field marshal and the governorship of Odessa, where a monument was erected to him as well as at Tiflis.

VÖRÖSMARTY, Mihály, a Hungarian poet, born at Nyék, in the county of Weissenburg, in 1800, died in Pesth, Nov. 9, 1856. He was a lawyer, but early gave up practice. In 1821 he published the drama "King Solomon" (of Hungary), which was followed by *Kont* and other dramas, numerous fine ballads and lyrical poems, and the epics *Zalán futása* ("The Flight of Zalan"), *Cserhalom*, *Tündérvölgy* ("Fairy Valley"), and *Eger* ("Erlau"), esteemed the finest in the Hungarian language. He was appointed secretary of the Hungarian academy soon after its foundation in 1830. His patriotic song entitled *Szózat* ("Appeal") became the great national song of Hungary. After the revolution of 1848–'9 he commenced a version of Shakespeare, but did not finish it. The edition of his works by Paul Gyulai (10 vols., 1865–'6) contains a biography.

VORSTIUS, Conrad (KONRAD VORST), a German Protestant theologian, born in Cologne, July 19, 1569, died at Tönningen, Holstein, Sept. 29, 1622. He took his degree at Heidelberg in 1594, and subsequently lectured on theology at Geneva. In 1596 he became professsor at Steinfurt, where a divinity school had been founded by Count Arnold of Bentheim, at whose request he soon afterward went to Heidelberg to clear himself of a charge of Socinianism. Though acquitted, suspicion still clung to him. After the death of Arminius in 1609, he succeeded him as professor of theology at Leyden, but was bitterly attacked, especially for his treatise *De Deo* (Steinfurt, 1610), which in England was burned publicly by order of James I. The synod of Dort in

1619 finally expelled him from Holland as a heretic. He lived two years in concealment, but an asylum was offered by the duke of Holstein to him and the Arminians, and on a tract of land given them they built the town of Friedrichstadt. Vorstius wrote many controversial works, and some few devotional, principally in Latin, but also in German and Dutch.

VOS, Martin de, a Flemish painter, born in Antwerp about 1530, died there in 1603 or 1604. He studied in his native city under his father, Peter de Vos, a native of Leyden, and under Francis Floris, and in Venice under Tintoretto. There are upward of 600 prints after his designs. He chiefly excelled in religious paintings, the best in the museum of Antwerp being "The Triumph of Christ," "Cæsar's Penny," and "St. Luke painting the Portrait of the Virgin."

VOSGES (Ger. *Vogesen* or *Wasgau*), a chain of mountains in N. E. France and the German Reichsland of Alsace-Lorraine, forming a continuation of the Jura chain. They separate the Rhine from its W. affluent the Moselle, run N. along the borders of Alsace on the east, and of the French departments of Haute-Saône, Vosges, and Meurthe-et-Moselle, and of German Lorraine on the west, forming the W. boundary of part of the basin of the Rhine, the corresponding E. boundary being formed by the Black Forest. The Hardt in Rhenish Bavaria is a N. prolongation of the chain, and the Faucilles connect it with the plateau of Langres and the Côte d'Or in the southwest. The rivers Moselle, Meurthe, Saar, Ill, and Ognon have their sources in these mountains. The average height is from 3,000 to 4,000 ft., and the rounded tops, covered with snow for several months, are called balloons, the principal being the Ballon de Guebviller (Gebweiler), nearly 4,700 ft. high, Ballon d'Alsace, and Ballon de Servance. The mountains are generally divided into the upper, central, and lower Vosges. They are well wooded, and have mines of iron, lead, rock salt, and especially copper, and numerous mineral and thermal springs. Goitre and cretinism are prevalent.

VOSGES, a N. E. department of France, formed from the S. portion of the ancient province of Lorraine, bordering on Meurthe-et-Moselle, Haute-Marne, Haute-Saône, and Alsace-Lorraine; area, 2,266 sq. m.; pop. in 1872, 392,988. It has the Vosges mountains on the east and the Faucilles in the south, and is drained by the Moselle, Meurthe, Meuse, and Saône. The climate is temperate in the lowlands and cold in the mountains. The soil in the valleys is fertile. The principal crops are potatoes, hops, flax, hay, and fruits. Many medicinal plants are cultivated. In the mountains are forests of oak, ash, &c. There are manufactures of iron and steel, cutlery, and paper. The exports are principally timber, pork, and cheese. The canton of Schirmeck, containing 12 communes, and six other communes, with an aggregate population of 21,017, were annexed in 1871 to Germany. The department is divided into the arrondissements of Épinal, Mirecourt, Neufchâteau, Remiremont, and St. Dié. Capital, Épinal.

VOSS, Johann Heinrich, a German scholar, born at Sommersdorf, Mecklenburg, Feb. 20, 1751, died in Heidelberg in March, 1826. He became in 1769 a private tutor, and in 1772 went to Göttingen as associate editor of the *Musenalmanach*, and was a prominent member of the *Hainbund*. He studied there under Heyne, with whom he often differed, which resulted in life-long enmity. In 1775 he joined Claudius at Wandsbeck, near Hamburg; in 1777 married the youngest sister of Boje, his former associate editor; and in 1778 became rector of the gymnasium at Otterndorf in Hanover. After a protracted controversy with Lichtenberg, a friend of Heyne, on account of Voss's manner of writing Greek names, he published in 1781 his great translation of the Odyssey, which has ever since been the standard German version of that poem. In 1782 he became rector of the gymnasium of Eutin. Here he wrote many elegant original poems, and in 1789 published his edition of Virgil's Georgics with a German version, and a commentary, of which Niebuhr declared that it left nothing for future commentators to do. In 1793 he published his translation of the Iliad, followed by a revised edition of the Odyssey, which, though perhaps more correct than the previous version, was not so popular. He now devoted himself to the study of Grecian mythology, mostly in opposition to Heyne's views; and his researches were embodied in his *Mythologische Briefe* (2 vols. 8vo, Königsberg, 1794). In 1797 he edited the Eclogues of Virgil, accompanied by a translation and a commentary. In 1799 he published a translation of the Æneid. His original poems, including the famous idyllic narrative *Luise*, were collected in four volumes in 1802. His health failing, he now resigned his office, received a pension of 600 thalers, lived for some years in retirement at Jena, and in 1803 published in the *Allgemeine Literaturzeitung* of that city the famous review of Heyne's edition of Homer, which created a great sensation. The elector (afterward grand duke) of Baden having invited him to Heidelberg with an offer of a pension of 1,000 florins, he removed thither in 1805, and produced improved editions of his works, besides numerous new ones, among which were translations of Horace, Hesiod. Theocritus, Bion, Moschus, Tibullus, Lygdamus, Aristophanes, and Aratus. When 68 years old he began, in conjunction with his sons Heinrich and Abraham, a translation of Shakespeare, which was not completed at the time of his death. The conversion of his friend Count Friedrich Stolberg to Roman Catholicism led to his essay *Wie ward Fritz Stolberg ein Unfreier* (1819), in which he attacked the Roman Catholics and the Protestant mystics of Germany. This produced a widespread controversy. Voss translated much from French and English. His shorter pieces were published in 1829 under the title *Kritische Blätter, nebst geographischen Abhandlungen* (2 vols., Stuttgart). His son Abraham published *Briefe von Johann Heinrich Voss, mit erläuternden Beilagen* (3 vols., 1829–'33). In 1838 appeared a volume of Voss's *Anmerkungen und Randglossen zu Griechen und Römern.* His biography has been written by Paulus (1826), Döring (1833), and Herbst (1872 *et seq.*).

VOSSIUS, or **Voss. I. Gerard Johannes,** a Dutch philologist, born near Heidelberg in 1577, died in Amsterdam, March 17, 1649. He studied at Dort and Leyden, and at the age of 22 was appointed master of the public school of Dort, in 1614 director of the theological college at Leyden, and in 1618 professor of eloquence and chronology. Shortly afterward he was deprived of his professorship on the charge of Arminianism, founded upon his *Historia de Controversiis quas Pelagius ejusque Reliquiæ moverunt* (1618); but in 1621 the synod of Rotterdam restored him on condition that he should neither speak nor write against the synod of Dort. For some years he refused to comply with the condition, and in the mean time was prohibited from teaching. Archbishop Laud procured him a prebend in the cathedral of Canterbury, which he was permitted to hold as a sinecure till 1629, when he visited England and was installed. He returned to Holland soon after, and in 1633 became professor of history in a college then newly founded at Amsterdam. He wrote *Ars Rhetorica* (1623); *De Historicis Græcis* (1624); *De Historicis Latinis* (1627); *Aristarchus, sive de Arte Grammatica* (1635); *De Theologia Gentili* (1642); *De Rhetorices Natura et Constitutione* (1647); and various other treatises on history, poetry, rhetoric, logic, and the mathematical sciences. His collected works are in 6 vols. fol. (Amsterdam, 1695–1701). **II. Isaac,** a Dutch author, son of the preceding, born in Leyden in 1618, died at Windsor castle, England, Feb. 21, 1689. After his studies with his father were completed he visited Italy, France, and England, and in 1648 was invited to Sweden by Queen Christina. A misunderstanding with Salmasius exposed him to the queen's displeasure, and he returned home in 1650. He was requested by the states of Holland to write a history of the war between England and Holland, but refused; upon which he was deprived of his pension, and in 1670 went to England. At Oxford he was made a doctor of laws, and Charles II. made him a canon of Windsor in 1673. Among his best known works are his *De Poematum Cantu et Viribus Rhythmi* (1673), *Variarum Observationum Liber* (1685), and editions of Catullus, Ignatius, and Pomponius Mela.

VOUET, Simon, a French painter, born in Paris, Jan. 9, 1590, died there, June 30, 1649. He studied under his father, and in 1611 went with the French ambassador to Constantinople, where he painted from memory a portrait of the sultan Ahmed I. After familiarizing himself at Venice with the style of Paul Veronese, he settled in 1613 in Rome, became a rival of Domenichino and an imitator of Guido and Caravaggio, and in 1624 was made prince of the academy of St. Luke. In 1625 he married the painter Virginia di Vezzo of Velletri. In 1627 Louis XIII., who had long paid him a pension of 2,000 francs, invited him to the Louvre. He became his principal painter, and was employed in embellishing the palaces at Paris, Versailles, and Fontainebleau, Richelieu's chapel at his château of Rueil, and many of the churches. His "St. Francis de Paula resuscitating a Child," in the church of the Minims, and "Presentation in the Temple," in the Louvre, are his masterpieces.

VUILLAUME, Jean Baptiste, a French violin maker, born at Mirecourt, Vosges, Oct. 7, 1798, died in Paris in 1874. His great-grandfather worked under Antonio Stradivari, and his grandfather was celebrated as a violin maker. Jean early exhibited great skill in his father's shop, and in 1818 went to Paris, where he soon became distinguished. He revived the long neglected laws of acoustics in the manufacture of violins, making a special study of all the qualities of the ancient instruments, particularly the varnishes; and he attempted to imitate the old violins by means of chemically prepared wood. He aimed to copy exactly the violins of Stradivari, the Amatis, and Giovanni Paolo Maggini, and invented a machine for reproducing any model. He also made bows after the model of Tourte. In 40 years he turned out more than 3,000 violins, many of which he made himself throughout. In the Paris exposition of 1855 he received the unique grand medal of honor accorded to the best maker of stringed instruments with bows; and in the exposition of 1867 he was declared above the range of competition. He was intimate with the Italian connoisseur Tarisio, and purchased his entire collection.

VULCAN, the Latin name of the Greek Hephæstus, the god of fire, and of the arts and industries dependent on fire. According to the Hesiodic theogony, he was one of the 12 great gods of Olympus; but one account made him the son of Jupiter and Juno, the other of Juno alone. In Homer he is represented as deformed from his birth, and his appearance so disgusted his mother that she dropped him from Olympus into the sea, where he was kindly treated by Thetis and Eurynome, with whom he remained nine years. Later writers relate that he was brought up in heaven with the other gods, and that once interfering in behalf of his mother, who had been fastened by Jupiter with a golden chain, he was hurled by the latter down from Olympus. He was a whole day in passing to the earth, and at evening fell in the island of Lemnos. His leg was broken by the fall. There he built himself a palace, and constructed workshops and forges.

Afterward he returned to Olympus and acted as mediator between Jupiter and Juno. As god of art and industry he worked in a shining palace in Olympus, or, according to later accounts, in the heart of a volcanic island, aided by the Cyclops, and forged the ægis and a sceptre for Jupiter, the armor of Achilles, the weapons of Hercules, and for himself two handmaidens of gold who supported him like living beings as he walked. Charis, Aglaia, and Venus are variously named as his wife. Besides Lemnos, the islands of Sicily, Lipara, Hiera, Imbros, and others are mentioned as the terrestrial seats of his workshop.

VULGATE. See Bible, vol. ii., p. 613.

VULPIUS, Christian August, a German author, born in Weimar, Jan. 23, 1762, died there, June 26, 1827. He was educated at Jena and Erlangen, studied German romance, and published *Romantische Geschichten der Vorzeit* (12 vols., Leipsic, 1791–'8), and *Anekdoten aus der Vorzeit* (2 vols., Leipsic, 1797). From 1788 to 1797 he lived in Franconia, and subsequently, after residing in various cities, returned to Weimar, where he was made secretary of the court theatre, then under the direction of Goethe. He wrote the famous robber romance *Rinaldo Rinaldini* (3 vols., Leipsic, 1798), and numerous comic stories and stories of the middle ages, dramas, and operas. Becoming secretary of the library, and afterward first librarian, he published *Curiositäten der physisch-literarisch-artistisch-historischen Vor- und Mitwelt* (10 vols., Weimar, 1810–'23), and *Die Vorzeit* (4 vols., Erfurt, 1817–'21).—His sister, Johanna Christiane Sophia (born in Weimar, June 1, 1765), became acquainted with Goethe in 1788, was employed for a time in a domestic capacity under his roof, and bore him a son; he afterward married her. She died June 6, 1816.

VULTURE, the common name of the carrion-eating, diurnal birds of prey, of the family *vulturidæ* (Vigors). This family included all the naked-headed, carrion-eating *raptores* of both hemispheres; the vultures of the new world are now placed in the family *cathartidæ*, and those of the old world, coming nearer the *falconidæ*, in the family *vulturinæ*, excluding the lammergeyer and the Egyptian vulture; the two families, though similar in habits, are very different in anatomical structure, especially in the conformation of the feet. The characters of the families are thus given by Baird, Brewer, and Ridgway: *cathartidæ*—nostrils horizontal, perforate; a well developed web between the inner and middle toes, at the base; *vulturinæ*—nostrils vertical, not perforate; no trace of web between inner and middle toes. The bill is elongated, sometimes slender, never so strong as in the *falconidæ*, straight in the basal portion, and suddenly hooked but not toothed at the tip; eyes on the level of the head, or without prominent superior bony ridge; wings long and pointed; tarsi short, stout, bare of feathers, and covered with scales; toes moderate, the hind one short and rather elevated, and all with strong, blunt claws; in the typical forms the head and neck are bare, or clothed only with a woolly down. They are cowardly and filthy, feeding on carrion, gorging themselves to inactivity, and emitting a disgusting odor and a fetid secretion from the nostrils. As soon as an animal is dead, and sometimes before death, the body, in warm climates, is surrounded by these birds, which suddenly appear, coming from all quarters, where one was not visible before. They are invaluable in tropical regions for devouring animal substances, whose speedy decomposition would otherwise engender pestilential diseases. They use the beak rather than the claws in tearing and seizing their food; their gait is awkward, and the wings are so long that they hold them half extended when walking; their voracity is extreme; they are the only gregarious birds of prey.—The group of bearded vultures (*gypaëtinæ*), coming nearest the eagles in appearance and habits, has been sufficiently noticed under Lammergeyer, the largest of European birds. The *vulturinæ* are principally confined to the warm regions of the old world; a few prey upon small living animals, but most feed upon carrion, which they detect by the sense of sight at great distances; they are good fliers, soaring to a great elevation and sailing in large circles; the nest is on the ground, amid inaccessible rocks, and sometimes in trees; the eggs are two to four. In the genus *vultur* (Linn.) the bill is large, elevated, and arched; third and fourth quills longest; shafts of tail feathers strong and projecting beyond webs; claws slightly curved and sharp, and with the bill more like those of the ordinary birds of prey; head with scattered down, and hind head generally with a transverse crest of thicker down, and ruff of neck advancing toward it. The flight is slow but elevated; the nest is very slightly made, and the young are

Griffon (Gyps fulvus).

fed with the regurgitated food of the parents. The griffon or tawny vulture (*gyps fulvus*, Sav.) is 3½ ft. long and 8½ ft. in alar extent, of a brownish gray approaching fawn, the down of the head and neck cinereous white, and the collar mixed white and brown; quills and tail brown; the bill is large and swollen at the sides. It is widely extended among mountainous regions, frequenting the Alps, Pyrenees, and Caucasus in summer, going south in winter; the nest is sometimes made in lofty trees. The Egyptian vulture, sometimes called Pharaoh's chicken (*neophron percnopterus*, Sav.), and by some regarded as belonging to a distinct subfamily, is about 2½ ft. long, with a very long and slender bill, the third quill the longest, tail moderate and wedge-shaped, and tarsi plumed below the knees; the adult male is white with black quills, the female and young brown. It is held in high esteem by the Egyptians for its services in devouring the filth of their cities and the decaying matters brought down by the Nile; it is often represented on their monuments. It sometimes devours small living animals. It follows caravans, consuming everything that dies.

California Vulture (Pseudogryphus Californianus).

Carrion Crow (Catharista atrata).

From Africa they come to the Pyrenees and Alps.—Among the American vultures or *cathartidæ*, the condor and the turkey buzzard have been described under those titles; the king vulture has been noticed under the former. The California vulture (*pseudogryphus Californianus*, Shaw) is the largest rapacious bird of North America, being over 4 ft. long and about 10 ft. in extent of wings; it is shining black above, duller below, with secondaries grayish, white band on wings, bill yellowish white, and head and bare neck orange yellow and red; it is found west of the Rocky mountains, especially in the vicinity of rivers, and is inferior in size only to the condor, which it resembles in habits. The black vulture or carrion crow (*catharista atrata*, Bartr.) is 23 in. long and 4½ ft. in alar extent; the color is deep black, with a bluish gloss on the back and wings; shafts of quills white; head and naked part of neck with warts and a few hair-like feathers, and bluish black; bill dark, yellowish at the end. It is found in the southern states and Central and South America, gregarious, associating with the turkey buzzards, and with them performing the office of scavengers, even in the streets of populous cities. It is common in Chili and Peru, and in the latter Tschudi speaks of it as sitting in incredible numbers on the walls of the streets and on the roofs of houses, in the midday heat, asleep with the head under the wings.

W

W, THE 23d letter of the English alphabet. It is peculiar to some of the Teutonic and Celtic languages, being foreign to the Romanic, and in sound, though not in form, also to the Slavic branches of the Indo-European family, while retained by its Asiatic branches. Its earliest historical appearance is in a diploma of Clovis III. at the end of the 7th century. It is formed, as its name in English shows, by the doubling of the letter *u* or *v*. In English, Welsh, Dutch, and Flemish, and in German (as spoken in some parts) after *sch* and *z*, it is so pronounced that while most writers describe it as a semi-vowel, others, including Noah Webster, have classed it as a pure vowel, equivalent in fact to the English *oo;* but Léon Vaïsse contends that in these cases it is a perfect consonant of the labial class, being produced by a movement of the larynx, while the vowels are sounded by a steady tension of the walls of the pharynx. Jakob Grimm also classes it as a labial aspirate. In German, except in the cases above mentioned, and in Swedish, in which it has long been comparatively disused, it has the value of our *v*, as it has in the vulgar English of London. In Danish and Icelandic it is used only in writing foreign words. In Welsh *w* is used as a vowel, representing the English *oo*, as *pwll*, pool; and its combinations with other vowels, in which the sound is the same as in English, are classed as diphthongs. In English, at the end of words, it is either silent, as in *low*, *crow*, or modifies the preceding vowel, as in *new*, *paw*, *how;* at the beginning of words it is silent before *r*, as in *write*, *wrong.*—W was doubtless originally a guttural. In French writing of the 11th–14th centuries it was used indifferently instead of *g*, the word *guide*, for instance, being then often written *wide;* while on the other hand *g* is used as an equivalent for *w*, as in *Guillaume*, William, *Galles*, Wales, *Gauthier*, Walter. The same interchange of letters takes place in English in *ward* and *guard*, *warranty* and *guaranty*. In many English words beginning with *wh*, the *w* is of modern introduction; thus, *whole*, Sax. *hal*, was written without a *w* until the latter part of the 16th century.

WAAGEN, Gustav Friedrich, a German writer on art, born in Hamburg, Feb. 11, 1794, died in Copenhagen, July 15, 1868. After serving as a volunteer in 1813–'14, he continued his art studies at Breslau, Dresden, Heidelberg, and Munich. He was employed in the preliminary labors for the new museum in Berlin, and in 1832 was appointed director of the portrait gallery in it. In 1844 he became professor of the history of art in Berlin. Besides a pamphlet on Egyptian mummies (1820), and a monograph on Hubert and Jan van Eyck, he published *Kunstwerke und Künstler in England und Paris* (3 vols., 1837–'9), a translation of the English portion of which (London, 1838) formed the basis of his "Treasures of Art in Great Britain" (3 vols., 1854), and the supplementary volume, "Additional Art Treasures in Great Britain" (1857). His remaining works comprise *Kunstwerke und Künstler in Deutschland* (2 vols., 1843–'5); *Die Gemäldesammlung in der kaiserlichen Ermitage in St. Petersburg* (1864); *Die vornehmsten Kunstdenkmäler in Wien* (2 vols., 1866–'7); and essays on Rubens, Mantegna and Signorelli, Spanish art, &c., for Raumer's *Historisches Taschenbuch* and the *Jahrbücher für Kunstwissenschaft.* A. Woltmann, K. von Lützow, and Bruno Meyer have collected his posthumous papers (*Kleine Schriften*, Stuttgart, 1875); and the "History of Painting: the German, Flemish, and Dutch Schools," based on Kugler's "Handbook," originally edited by him, was revised and rewritten by J. A. Crowe (London, 1876).

WABASH. I. A N. E. county of Indiana, drained by the Wabash, Salamonie, and Eel rivers; area, 420 sq. m.; pop. in 1870, 21,305. It has a diversified surface, partly covered with fine forests, and the soil is highly fertile. The county is intersected by the Wabash and Erie canal, and the Toledo, Wabash, and Western railroad. The chief productions in 1870 were 537,883 bushels of wheat, 443,901 of Indian corn, 75,456 of oats, 51,279 of potatoes, 22,628 of flax seed, 382,374 lbs. of butter, 64,331 of wool, 41,000 of tobacco, and 11,157 tons of hay. There were 6,658 horses, 5,256 milch cows, 6,879 other cattle, 21,464 sheep, and 22,195 swine; 1 manufactory of hubs and wagon material, 2 of iron castings, 1 of linseed oil, 5 tanneries, 5 currying establishments, 12 saw mills, 2 planing mills, and 2 woollen mills. Capital, Wabash. **II.** A S. E. county of Illinois, bordering on Indiana, bounded S. E. by the Wabash river, and W. by Bonpas creek; area, 110 sq. m.; pop. in 1870, 8,841. The surface is generally level and diversified with prairie and forest, and the soil is fertile. It is traversed by the Cairo and Vincennes and the Louisville, New Albany, and St. Louis railroads. The chief productions in 1870 were 202,201 bushels of wheat, 421,361 of Indian corn, 110,793 of oats, 20,428 of potatoes, 39,335 lbs. of butter, 23,744 of wool, and 6,497 tons of hay. There were 2,122 horses, 1,707 milch cows, 2,223 other cattle, 8,312 sheep, and 10,227 swine; 14 manufactories of carriages and wagons, 4 of furniture, 2 of sash, doors, and blinds, 4 flour mills, and 8 saw mills. Capital, Mount Carmel.

WABASHAW, a S. E. county of Minnesota, bounded E. by the Mississippi river, which separates it from Wisconsin, and intersected by Zumbro and other rivers; area, about 470 sq. m.; pop. in 1870, 15,859; in 1875, 17,296. The surface is undulating, with some prairie, and the soil fertile. Lake Pepin lies on the E. border. The chief productions in 1870 were 1,480,293 bushels of wheat, 312,697 of Indian corn, 669,410 of oats, 80,125 of barley, 97,700 of potatoes, 376,729 lbs. of butter, and 11,618 tons of hay. There were 5,385 horses, 4,374 milch cows, 7,304 other cattle, 2,819 sheep, and 8,238 swine; 2 manufactories of agricultural implements, 8 of carriages and wagons, 4 of furniture, 4 of lime, and 3 flour mills. Capital, Wabashaw.

WABASH COLLEGE, an institution of learning at Crawfordsville, Ind., under the control of the Presbyterians. It was founded in 1832, and opened and chartered in 1833. The first class graduated in 1840. The college grounds contain 33 acres, shaded with native forest trees. There are four college buildings. It comprises a collegiate department with classical and scientific courses, a preparatory department, and an English and mercantile course. It has valuable philosophical and chemical apparatus, a cabinet of about 30,000 specimens, and libraries containing about 12,000 volumes. There are scholarships for needy and deserving students. In 1873–'4 there were 11 instructors and 215 students (86 collegiate, 80 preparatory, and 49 English and mercantile). The presidents have been as follows: the Rev. Dr. Elihu Baldwin, 1835–'40; the Rev. Dr. Charles White, 1841–'61; and the Rev. Joseph F. Tuttle, D. D., appointed in 1862.

WABASH RIVER. See INDIANA, vol. ix., p. 233.

WABAUNSEE, a N. E. county of Kansas, bounded N. by the Kansas river, and drained by several streams; area, 804 sq. m.; pop. in 1870, 3,362; in 1875, 4,649. The surface is undulating and the soil productive. The chief productions in 1870 were 63,451 bushels of wheat, 220,365 of Indian corn, 38,243 of oats, 35,669 of potatoes, 69,685 lbs. of butter, and 11,640 tons of hay. There were 1,983 horses, 2,692 milch cows, 3,878 other cattle, 862 sheep, and 1,466 swine. Capital, Alma.

WACE, Master Robert, an Anglo-Norman poet, born in Jersey about 1110, died probably in England about 1184. His name is variously written. He resided at Caen, and is supposed to have been a favorite chaplain of Henry II. In 1161 he was a canon of the cathedral church at Bayeux. His authentic works comprise *Le roman de Rou* (*Rollo*) *et des ducs de Normandie*, a poem written about 1170, partly in Alexandrine and partly in octosyllabic verse, and remarkable as a monument of the language and as a picturesque record of memorable events, including the Norman conquest of England; *Le roman de Brut* (1155), a paraphrastic version of Geoffrey of Monmouth's "British History;" *Le chronique ascendante des ducs de Normandie;* and some shorter poems. A critical edition of the *Roman de Rou*, with notes by F. Pluquet, was published in Rouen in 1827 (2 vols. 8vo); and more recently has been published "The Conquest of England, from Wace's Poem," translated by Sir Alexander Malet (4to, London, 1860), including the text illustrated by photographs from the Bayeux tapestry.

WADAY, or **Wadai,** a kingdom of central Africa, in Soodan, between lat. 8° and 17° N., and lon. 16° and 22° 30′ E., bounded N. by the Sahara, E. by Darfoor, S. by Dar Banda, and W. by Baghirmi and Bornoo; length from N. to S. about 600 m., breadth from E. to W. about 400 m.; pop. estimated at 2,500,000. The natives generally call it Dar-Saleyh, and in Darfoor, Kordofan, and Bornoo it is called Borgoo. Its surface is generally level, and from 1,000 to 1,500 ft. above the sea, with a westward slope from a mountain range near the frontier of Darfoor. The country is also mountainous in the southwest, adjoining Baghirmi, and there are many isolated groups of hills. In the north are extensive desert tracts, but the south is better watered and more fertile. The kingdom comprises numerous tribes of negroes and Arabs, and is governed by a sultan who resides at Abeshr, and under whom there are seven provincial governors. Although Waday is mainly a pastoral country, rich in horses and flocks, it has a considerable commerce, which is subject to a large tax. The principal articles of trade are salt, copper, fine cloths, harnesses, coats of mail, beads, calico, paper, needles, ivory (mainly from Dar Runga, a vassal state which forms the S. E. corner of the sultan's dominions), and tobacco. It appears that the large bargains are usually made in cattle, and the smaller in strips of cotton cloth. There are few manufactures, and these generally of the rudest kind; but the people are said to be skilful workers in iron. The army consists of 46,000 troops, of whom 6,000 are cavalry. The country has long been subject to civil war. The religion is Mohammedanism.—It is asserted that the foundation of what is now the kingdom of Waday was laid by Abd-el-Kerim as long ago as 1020. He established his seat in a mountainous district near the town of Wara. This town was long the capital, but was destroyed prior to Nachtigal's visit to the country in 1873, and he found the seat of government at Abeshr. The kingdom, according to the accepted accounts, has thus existed for more than 800 years, with a regular succession of sovereigns. Waday has been seldom and slightly explored by Europeans. The German traveller Vogel was killed there in 1856, but in 1873-'4 Nachtigal traversed the country from the vicinity of Lake Tchad to Darfoor, and our knowledge of it is principally derived from him.

WADDING, Luke, an Irish scholar, born in Waterford, Oct. 16, 1588, died in Rome, Nov. 18, 1657. He studied for six months at the Jesuit seminary of Lisbon, joined the Franciscans in 1605, and completed his education in Portugal. After taking orders he was sent to teach theology at Salamanca; and in 1618 he accompanied Antonio á Trejo, bishop of Cartagena, who went to Rome as ambassador to settle the controversy relating to the immaculate conception. He wrote the history of the embassy in a folio volume. From 1630 to 1634 he was procurator of the Franciscans at Rome, and from 1645 to 1648 vice commissary of his order. He founded in 1625 the college of St. Isidore for the education of Irish Franciscans. He was one of the councillors appointed in the case of Jansenius, whose doctrines he favored, but he retracted his opinion as soon as they were condemned by the papal bull. His most important work is his history of the order of Franciscans, entitled *Annales Ordinis Minorum* (8 vols. fol., Lyons and Rome, 1647-'54). He also edited a collection of the writings of Duns Scotus (12 vols. fol., Lyons, 1639), and wrote a bibliographical history of the Franciscans, *Scriptores Ordinis Minorum.*

WADDINGTON, William Henry, a French archæologist, born in Paris, of English Protestant parents, in 1826. He graduated at Cambridge in 1849, and followed his father, a rich manufacturer, to France, where he was naturalized. He became known by his archæological explorations in Asia Minor, in 1865 was elected to the academy of inscriptions and to the legislative body, and in 1871 to the national assembly, and again in 1876, when he became minister of public instruction and fine arts, which former office he had held under Thiers from May 19 till May 24, 1873. His first wife died in 1852; in 1875 he married Miss King of New York. His works include *Voyage en*

Asie Mineure au point de vue numismatique (1850); *Mélanges de numismatique et de philologie* (1861); *Édit de Dioclétien* (1864); the Greek and Latin inscriptions in the continuation of Philippe Le Bas's *Voyage archéologique en Grèce et en Asie Mineure* (1868); and *Fastes des provinces asiatiques de l'empire romain depuis leur origine jusqu'au règne de Dioclétien* (1872 *et seq.*).

WADE, Benjamin Franklin, an American statesman, born in Springfield, Mass., Oct. 27, 1800, died in Jefferson, O., March 2, 1878. He worked as a farmer or laborer in summer and school teacher in winter till 1826, when he began to study law in Ohio, and in 1828 was admitted to the bar in Ashtabula co. In 1835 he was elected county prosecuting attorney, and in 1837 state senator, to which office he was twice reëlected. In 1847 he was chosen president judge of the third district of the state. In 1851 he was elected United States senator, and reëlected in 1857 and 1863. In the senate Mr. Wade was a steady opponent of all measures favoring slavery. In 1852 he voted, with only five other senators, to repeal the fugitive slave law; he also spoke and voted against the bill to abrogate the Missouri compromise, against the Lecompton constitution for Kansas in 1858, against appropriating $30,000,000 for the acquisition of Cuba, and against all the compromises between the north and south proposed after Mr. Lincoln's election in 1860. The homestead bill he advocated for years, and it was in his charge when it was finally passed by the senate in 1862. From the outbreak of the civil war in 1861 Mr. Wade labored incessantly for a more vigorous policy, was chairman of the joint committee on the conduct of the war, and urged the enactment of a law to confiscate all the property of leading secessionists and emancipate their slaves. As chairman of the territorial committee, he reported a bill in 1862 abolishing slavery in all the territories of the government, and prohibiting it in any that might afterward be acquired. After the assassination of President Lincoln in 1865 he became president *pro tempore* of the senate, and acting vice president of the United States; and in March, 1867, he was elected president of the senate. In 1871 he was one of the commission sent to Santo Domingo to report upon its proposed annexation to the United States, a scheme of which he approved.

WADENA, a W. central county of Minnesota, drained by the Crow Wing river; area, 540 sq. m.; pop. in 1870, 6; in 1875, 210. The surface is rolling and consists cheifly of prairies. Capital, Wadena.

WADSWORTH, James, an American philanthropist, born in Durham, Conn., April 20, 1768, died in Geneseo, N. Y., June 8, 1844. He graduated at Yale college in 1787, and in 1790 removed with his brother to the Genesee river, purchasing a large tract of land in what is now the town of Geneseo. In time he became one of the richest land proprietors in New York. He printed and circulated, at his own expense, publications on the subject of education, employed persons to lecture on it, and offered premiums to the towns which should first establish school libraries. As early as 1811 he proposed the establishment of normal schools. He procured the enactment of the school library law in 1838, founded a library and institution for scientific lectures at Geneseo and endowed it with $10,000, and in his sales of land always stipulated that a tract of 125 acres in each township should be granted free for a church, and another of the same size for a school. His donations to the cause of education exceeded $90,000.—His son James Samuel, born in 1807, distinguished himself by patriotism and philanthropy, and was mortally wounded in the battle of the Wilderness, where he commanded a division, May 6, 1864, and died on the 8th.

WAGER, in law, a contract by which two parties agree that a certain thing shall be done by one for the benefit of the other, on the happening or not happening of a contingent event. Wagers were certainly valid contracts at common law, but from early ages many exceptions were made. They were void if immoral, or opposed to public policy, or indecent, or tending to restrain or prevent marriage. In the United States, the objection has been extended to any wager about the age, height, weight, wealth, situation, or circumstances of any person, of any age or either sex. So, too, all wagers are void, and perhaps punishable, if such as to interfere with the free and honest exercise of the elective franchise. By the statute 8 and 9 Victoria, ch. 100, sec. 18, all wagers are null and void. Many of the states have similar statutes, and the general tendency of adjudication has been in the direction of making all wagers nullities. It may be said to be the general rule that money deposited on a wager may be recalled before the event is decided, and in many, perhaps in a majority of the states, at any time before it has been paid over. In some states by statute anything won on a wager and actually paid over may be recovered by the loser, and wagers, particularly on elections, are made punishable as offences. In Missouri, New York, and Wisconsin, by constitutional provisions, and in some other states by statutes, wagers on an election disqualify the parties making them from voting at that election. It may be doubted now whether an action by a winner of a mere wager or bet against a loser would be sustained in any court.

WAGER OF BATTLE. See Appeal, vol. i., p. 596.

WAGER OF LAW. See Criminal Law, vol. v., p. 487.

WAGNER. I. Richard (originally Wilhelm Richard), a German composer, born in Leipsic, May 22, 1813. His father was an actuary of police, and died when the son was a few months old. Richard received an incomplete scholastic education, though his mind had a literary cast, and at the Dresden Kreuzschule he was considered an apt scholar. When 12 years old he wrote plays. His thoughts were first fixed upon music as his profession at the age of 15, on becoming acquainted with Beethoven's symphonies. His first systematic studies were made under Theodor Weinlig while he was a student at the university of Leipsic. The first of his compositions of which he speaks was a *comédie champêtre*, written under the inspiration of the "Pastoral Symphony." This was never performed, but in 1833 a symphony written by him was presented at a concert in Leipsic; and in the same year he wrote a romantic opera entitled *Die Feen* ("The Fairies"). In the summer of 1834 he became musical director at the Magdeburg theatre, where in 1836 he brought out his opera *Das Liebesverbot*, of which the words and music were both his own, and which failed. He consequently resigned his place, and became musical director at Königsberg, where in 1836 he married. He soon after removed to Riga, where he remained, directing the music at the theatre, till 1839. To prepare himself for a favorable reception in Paris, he wrote in 1838 the beginning of a more elaborate opera than any he had previously composed, called *Rienzi*. On arriving in 1839 at the French capital he found that the want of means and influence interrupted all his plans. Meyerbeer the composer and Maurice Schlesinger, a music publisher and journalist, befriended him, and the latter gave him first employment, and afterward the opportunity of putting forward his claim to artistic recognition. He published songs, but their eccentric forms prevented their success. Schlesinger also procured for Wagner a commission to write an overture for the *société des concerts*, upon which he prepared his *Faust*, which was rehearsed once and then set aside, the society not hazarding the experiment of producing so eccentric a work. He also prepared vaudeville music for the minor theatres, until it was intimated that his compositions were altogether too fantastic for the purpose. Writing of these hard experiences, Wagner says: "Manifold difficulties and very bitter want encompassed my life at this period." He worked nevertheless with the courage of despair at his *Rienzi*, which he completed. For his support he made "instrumental arrangements of every imaginable kind, down to those for the cornet à piston," and contributed articles on German music to the *Gazette musicale*. He also set about the composition of the music to his opera *Der fliegende Holländer* ("The Flying Dutchman"), which he completed in seven weeks and sent to Meyerbeer at Berlin, where subsequently it was produced. Wagner went to Dresden in the spring of 1842, and in October of that year his *Rienzi* was there brought out. Its success procured for its composer the Prussian order of the red eagle and the position of chapelmaster at the Dresden opera house. During the time that he held this office he brought out his "Flying Dutchman" and composed *Tannhäuser*, which was produced in October, 1845, but received only two representations. Failing in this, he began to compose *Lohengrin*, an opera still more identified with his peculiar views of art. It was about to be produced at Dresden in 1849 when the revolutionary outbreak in Saxony took place. Wagner had always held extremely liberal political principles, having even in 1830 identified himself at the university with the liberal party. He was an active leader in the movement, and when it was suppressed took refuge in Zürich and became a citizen of the canton. In 1850 he was appointed director of the Zürich musical society and of the orchestra at the theatre. Here he remained till 1858, composing while there *Tristan und Isolde* and a portion of his great series of operas founded on the *Nibelungenlied*. Wagner had a steadfast friend and adherent in Franz Liszt, under whose direction and through whose efforts *Lohengrin* was first produced at Weimar, Aug. 28, 1850; and subsequently others of Wagner's works were given in the same city. After an absence of nearly ten years Wagner, having received a political pardon from the king of Saxony, took up his residence at Munich, where in King Louis of Bavaria he soon found an earnest adherent and powerful patron. Through his aid the *Tristan und Isolde* was produced under Von Bülow's direction in June, 1865; *Die Meistersinger von Nürnberg* in June, 1868; *Das Rheingold* in 1869; and *Die Walküre* in 1870. In 1861 an attempt had been made to obtain a hearing for the *Tannhäuser* at the grand opera of Paris, but, in spite of the favor of the emperor, so intense and unreasoning was the prejudice against the composer that his work met with deliberately planned opposition, and was withdrawn after the third representation. In Vienna in 1862 it was received with great favor. In 1870 Wagner married his second wife, Casina von Bülow, a daughter of Liszt, who had been divorced from Hans von Bülow in 1869. In this year he conceived the idea of erecting a theatre in which the four operas which he had built up on the myths of the *Nibelungenring* might be produced. He found the stage as it existed in Germany out of sympathy with his ideas of true German art, and so hampered by foreign traditions that neither the directors nor the audiences could be relied on to support him in the experiment he was determined on making, of founding an opera that should be thoroughly German in its spirit and purpose, having its motive in the traditional poetry of Germany, and entirely abandoning the musical forms that Italy and France had impressed upon the opera. In order to secure a certain isolation and a new field, he fixed upon the little city of Baireuth in Bavaria as the place in which to carry out his undertaking. In May, 1871, he issued a circular addressed to "the friends of art," calling for their coöperation in the work. The summer of 1873 was the time at which he expected to bring out his works; but though the answer to his appeal was generous, the fulfilment of his wishes was postponed until the summer of 1876. The corner stone of the proposed theatre was laid on May 22, 1872. The pianoforte rehearsals of the operas in question were had in July, 1875, and the orchestral rehearsals in August. Wagner's so-called "festival stage play" consists of the following operas: 1, *Das Rheingold*, in the nature of an introduction to the other three operas or trilogy; 2, *Die Walküre;* 3, *Siegfried;* 4, *Die Götterdämmerung.* An evening is to be devoted to each of these operas, and the entire series is to be performed three times, with intervals of about four days for rest between the several performances of the entire work.—Wagner's theories of operatic composition have occasioned wide discussion. They are extended, subtle, and metaphysical, and cannot readily be summarized; but the salient points of his musical creed may be stated in his own words: "The error in the opera as a species of art has consisted in the fact that a mere means of expression—that is, music—has been made the end, while the end of expression, the drama, has been made the means; and thus the actual lyric drama has been made to rest upon the basis of absolute music." In other words, in the modern Italian opera the play itself, its incident, progress, and climax, has no interest for the audience; they go simply to hear certain arias, duets, and concerted pieces. In Wagner's opinion, the drama itself should be the centre of interest; it should be founded upon some poetical and legendary subject, identified with the history of the people for whom the opera is written, such for example as the myths of the Nibelungen poetry. To the illustration of this drama the arts of music, painting, and architecture should lend their aid, all combining with intent to give expression to the poet's thought. Of course the artificially constructed arias of the Italian opera, where the whole interest of the drama is suspended and the attention concentrated upon the musical setting of some meaningless verses, are done away with. Wagner believes that the music should spring directly from the requirements of the text; that instead of having here and there melodies with intervening recitative, the whole opera should be melody; and he has given to his substitute for the ordinary forms the name of *melos.* It is his effort to redeem the stage, which, as he contends, is now "insincere and trivial, its music lacking in pertinence to the verbal text, its forms dictated by a desire to conciliate the vanity of singers or the interests of music dealers, and its verbal text itself of low poetical merit." The orchestra also, in his system, is exalted to great importance, taking its large share as a means of heightening the interest and giving vitality and color to the whole work; it ceases to be a mere instrument of accompaniment, and becomes as closely identified with the purpose of the play as the actors themselves, entering into and reflecting and as it were commenting on and enforcing the text. The experiment at Baireuth is relied upon by him to vindicate these theories. He has expressed his ideas at great length in his various literary works, which have been collected and published in 9 vols., under the title *Gesammelte Schriften und Dichtungen* (Leipsic, 1871). The principal works contained in this edition are his *Autobiographische Skizze, Ein Deutscher Musiker in Paris* (7 *novellen*), *Das Judenthum in der Musik* (1852), *Oper und Drama* (1852), *Die Kunst und die Revolution* (1849), *Das Kunstwerk der Zukunft* (1850), *Ueber Schauspieler und Sänger*, and *Beethoven* (1870); also the poetical text of his principal operas. The publishing house of J. Gutmann in Vienna purchased in 1876 the copyright of his contemplated new opera *Parcival.* Wagner has also composed a portion of the music to be performed at the opening of the American centennial exhibition of 1876.—See *Richard Wagner und die neuere Musik* (Halle, 1854); "Richard Wagner and the Music of the Future," by Franz Heuffner (London, 1874); and "Art Life and Theories of Richard Wagner," by E. L. Burlingame (New York, 1875). **II. Johanna,** a niece of the preceding, born Oct. 13, 1828. Her father, Albert (born in Leipsic in 1799, died in Berlin, Oct. 31, 1874), began life as a tenor singer, and in 1857–'9 was manager of the royal opera at Berlin, and brought out *Tannhäuser* and *Lohengrin.* The daughter appeared in comedy in 1843, and a little later in opera, chiefly at Dresden, which city she quitted in 1849 with her uncle. Subsequently she performed at Hamburg and Vienna, and in Berlin from 1853 to 1859, when she married Herr Jachmann, a councillor in the Prussian service, and accepted an engagement for the drama at the royal theatre. She excelled in her uncle's operas, and in those of Gluck and Meyerbeer, and especially as Fides in *Le prophète*, and proved to be an accomplished tragédienne.

WAGNER. I. Rudolph, a German physiologist, born in Baireuth, June 30, 1805, died in Göttingen, May 13, 1864. He graduated in medicine at Würzburg in 1826, studied under Cuvier in Paris, and made geological explorations in France and Sardinia. He was tutor and professor of zoölogy at the university of Erlangen from 1829 to 1840, when he succeeded Blumenbach at Göttingen. He was distinguished in physiology, comparative anatomy, and anthropology. His works include *Lehrbuch der vergleichenden Anatomie* (2 parts, Leipsic, 1834–'5; 2d ed., entitled *Lehrbuch der Zootomie*, 1843–'7); *Icones Physiologicæ* (1839–'40; new ed. by Ecker, 1852–'4); *Lehrbuch der Physiologie* (1839; 4th ed. by Funke, 1854–'7); *Handwörterbuch der Physiologie* (4 vols., Brunswick, 1842–'53); *Neurologische Untersuchungen*

(1854), which involved him in a controversy with Karl Vogt and others of the materialistic school, of which he was one of the most eminent opponents; *Der Kampf um die Seele* (Göttingen, 1857); and *Vorstudien zu einer wissenschaftlichen Morphologie und Physiologie des menschlichen Gehirns als Seelenorgans* (2 vols., 1861–'3). **II. Moritz Friedrich**, a German naturalist, brother of the preceding, born in Baireuth, Oct. 3, 1813. He was engaged in business till 1834, after which he studied zoölogy and other sciences at Erlangen and Munich. The French government adjoined him to the scientific commission in Algeria (1837–'8), and after studying geology at Göttingen he was enabled by the academy of Berlin to explore for three years the Black sea region, the Caucasus, Armenia, Kurdistan, and Persia, and made extensive collections of natural history, which are now in the museums of Paris, Vienna, and Munich. In company with Scherzer he travelled in the United States, Central America, and the West Indies in 1852–'5; and at the instance of King Maximilian II. of Bavaria he explored the province of Chiriqui and other parts of the isthmus of Panama in 1857–'8, and the E. part of the Andes in Ecuador in 1859. In 1860 he was appointed honorary professor at the university of Munich and director of the ethnographical museum. Subsequently he became known by his theories of migration in connection with those of Darwin. His works include *Reisen in der Regentschaft Algier* (3 vols., Leipsic, 1841); *Der Kaukasus und das Land der Kosacken* (2 vols., 1847); *Reise nach Kolchis* (1850); *Reise nach dem Ararat und dem Hochlande Armeniens* (Stuttgart, 1850); and *Reise nach Persien und dem Lande der Kurden* (2 vols., Leipsic, 1852; English translation, "Travels in Persia, Georgia, and Koordistan, with Sketches of the Cossacks and the Caucasus," 3 vols., London, 1854). He has also written, jointly with Scherzer, *Reisen in Nordamerika* (3 vols., Leipsic, 1854), and *Die Republik Costa-Rica* (1856).

WAGNER, Rudolf Johannes, a German chemist, born in Leipsic, Feb. 13, 1823. He was at first a practical pharmaceutist and chemist, afterward studied chemistry in Leipsic and Paris, and visited the principal factories and laboratories in Europe. In 1851 he became professor of chemistry in Nuremberg, and in 1856 of technology at Würzburg; and in 1858 he was also appointed inspector of technical studies in Bavaria. He is famous as a technologist, and has several times been a member of the juries at international exhibitions. His works include *Lehrbuch der Chemie* (1850); *Lehrbuch der chemischen Technologie* (1850); *Geschichte der Chemie* (1854); *Handbuch der Technologie* (5 vols., 1856–'63); and *Die chemische Fabrikindustrie* (1867). They have all passed through several editions, and some, including the "Handbook of Technology," have been translated into English. He is editor of the *Jahresberichte über chemische Technologie* (21st year, 1876).

WAGRAM, a village of Lower Austria, on the left bank of the Rossbach, 11 m. N. E. of Vienna, celebrated for a decisive victory of Napoleon, July 5–6, 1809, over the Austrians, commanded by the archduke Charles. The loss was about 25,000 on each side. The immediate result of the battle was the retreat of the Austrians to the heights of Znaym. After a second engagement an armistice was concluded on July 12, followed by the peace of Vienna, negotiated at the palace of Schönbrunn, Oct. 14. Berthier, for his share in the victory, was created prince of Wagram.

WAH. See PANDA.

WAHABEES, or **Wahabites**, an Arabian sect of Mohammedans, founded by Abd-el-Wahab in the middle of the 18th century in Nedjed, which, previous to the death of its founder in 1787, spread over a considerable portion of the Arabian peninsula. In 1805 only Hadramaut and Oman remained free from subjection to it, Mecca having been taken by the Wahabite armies in 1803, and Medina in 1804. The temporal power of the Wahabees was largely reduced by the Porte in 1818, when their sheikh Abdallah, the great-grandson of Saoud, the friend and protector of Abd-el-Wahab, was compelled to surrender to Ibrahim Pasha, the son of Mehemet Ali, and was taken to Constantinople and executed. The sect still exists, and is paramount in central Arabia, where, according to Palgrave, the dominions of the sultan of the Wahabees embrace not only Nedjed proper, but the adjacent provinces, and include 316 towns or villages, with a population of 1,219,000 in 1863.—Wahab reduced Mohammedanism to a pure deism; maintained that there had been no man directly inspired of God; that Moses and Jesus were virtuous men, but inferior in the perfection of their character to Mohammed, who however had no claim to be worshipped, since he was not of the divine nature. There is, according to his instruction, no revealed religion, no divine book; the Koran is a good book indeed, but not a revelation from God; the Mohammedan religion is entitled to be called a divine religion, not as revealed by God to man, but because of its perfection. All reverence for the tomb or the birthplace of Mohammed, or any other saint, was in his view idolatry, and the worship of the prophet's tomb was prohibited while the Wahabees held Medina. Mohammed preached for all nations, and not for the Arabs alone; his doctrines were approved of God, and were to be propagated by the sword, and all who would not adopt them or who neglected compliance with them were to be severely punished or put to death. Traditions are not to be regarded as binding on the conscience. Good works are only the consequence of the rule that we should adore God as if he were present to our eyes; and though we cannot see him, we must know that he sees us. The use of wine, opium, or tobacco was sternly prohibited, and the immoral practices in which many of the Mohammedans indulged were forbidden under severe penalties. An income tax was levied, under the name of alms, on all the members of the sect, for the support of the government and the propagation of their creed. The theocratic system of Wahab contemplated a divided power, the principal authority residing in the temporal chief, but the direction of all religious matters pertaining to the spiritual chief, and in all important matters the two advising together. Saoud, the first temporal chief of the Wahabees, had married the daughter of Wahab, and both the spiritual and temporal headship, after the death of the reformer, centred in the family of Saoud. During the period between 1765 and 1810 the chiefs acquired immense estates from the plunder of rebellious towns and the confiscation of their lands. Most of them afterward fell into the hands of Mehemet Ali. The present ruler of Nedjed and sultan of the Wahabees is a descendant of Saoud.—For an account of the Wahabite empire, see Palgrave's "Central and Eastern Arabia" (5th ed., London, 1869). See also *Histoire des Wahabites depuis leur origine jusqu'à l'an* 1809 (Paris, 1810), and Burckhardt's "Notes on the Bedouins and the Wahabys" (London, 1830).

WAHKIAKUM, a S. W. county of Washington territory, bounded S. by Columbia river; area, 225 sq. m.; pop. in 1870, 270. The surface is rough and mountainous, and generally covered with forests. Lumber is the chief wealth. Capital, Cathlamet.

WAHLSTATT. See LIEGNITZ.

WAHOO. See ELM.

WAHSATCH, a N. E. county of Utah, bordering on Wyoming and Colorado, and intersected by Green river and its tributaries; area, 9,500 sq. m.; pop. in 1870, 1,244. On the west are the Wahsatch mountains and on the north the Uintah. The resources are mostly undeveloped. The chief productions in 1870 were 23,670 bushels of wheat, 2,037 of oats, 10,109 of potatoes, and 1,329 tons of hay. The value of live stock was $51,571. Capital, Heber.

WAHSATCH MOUNTAINS. See ROCKY MOUNTAINS, vol. xiv., pp. 377–'8, and UTAH.

WAINWRIGHT, Jonathan Mayhew, an American clergyman, born in Liverpool, England, Feb. 24, 1792, died in New York, Sept. 21, 1854. His mother was a daughter of the Rev. Dr. Jonathan Mayhew of Boston. In 1803 his parents returned to the United States, and he graduated at Harvard college in 1812. He was ordained in the Protestant Episcopal church in 1816, and became rector of Christ's church in Hartford, Conn., in 1819 assistant minister of Trinity church, New York, and in 1821 rector of Grace church. He was rector of Trinity church, Boston, from 1834 to 1837, when he returned to Trinity parish, New York, having St. John's chapel more especially in his charge. In 1848–'9 he visited Europe and the East, and again in 1852, when the university of Oxford conferred upon him the degree of D. C. L. He was elected provisional bishop of the diocese of New York in October, 1852, and was consecrated Nov. 10. He published a volume of charts (1819); "Music of the Church" (1828); "There cannot be a Church without a Bishop" (1844), a controversy with the Rev. Dr. Potts; "The Choir and Family Psalter," with the Rev. Dr. Muhlenberg (1851); "The Pathways and Abiding Places of Our Lord" (1851); "The Land of Bondage" (1852); and some volumes of sermons. He also edited Bishop Ravenscroft's memoirs and sermons, and the life of Bishop Heber by his widow.

WAITE, Morrison Remich, seventh chief justice of the United States, born in Lyme, Conn., Nov. 29, 1816. He graduated at Yale college in 1837, studied law, and began to practise in Maumee City, Ohio. In 1849 he was a member of the legislature, and in 1850 he removed to Toledo. He declined repeated nominations to congress, and also a seat on the supreme bench of the state. In 1871–'2 he was one of the counsel of the United States before the tribunal of arbitration at Geneva. In 1873 he presided over the constitutional convention of Ohio. On Jan. 21, 1874, he became chief justice of the United States, and has since resided in Washington.

WAITZ, Georg, a German historian, born in Flensburg, Oct. 9, 1813. He was professor at Kiel from 1842 to 1848, a member of the Frankfort parliament in 1848–'9, and subsequently professor of history at Göttingen till 1875, when he was transferred to Berlin as editor of the *Monumenta Germaniæ Historica*, in conjunction with Mommsen and other scholars, to which he had previously made important contributions. His works include *Deutsche Verfassungsgeschichte* (4 vols., Kiel, 1843–'61; 2d ed., 1865 *et seq.*); *Die Schleswig-holsteinische Geschichte* (2 vols., Göttingen, 1851–'4); *Grundzüge der Politik* (Kiel, 1862); and *Die Formeln der deutschen Königs- und der römischen Kaiserkrönung vom* 10. *bis zum* 12. *Jahrhundert* (Göttingen, 1873).

WAITZ, Theodor, a German author, born in Gotha, March 17, 1821, died in Marburg, May 21, 1864. He graduated at Marburg, where he was professor of philosophy from 1848 till his death. His works include a new and critical edition of Aristotle's *Organon* (2 vols., Leipsic, 1844–'6); *Grundlegung der Psychologie* (Hamburg and Gotha, 1846); *Die Anthropologie der Naturvölker* (6 vols., Leipsic, 1860–'70; the last two edited by Gerland); and *Die Indianer Nordamerikas* (1864).

WAITZEN, or **Waizen** (Hun. *Vácz*), a town of Hungary, in the county and 20 m. N. of the city of Pesth, on the left bank of the Danube; pop. in 1870, 12,894. It has a Roman Catholic bishop, a fine cathedral after the model of St. Peter's at Rome, and other churches, an episcopal palace with Roman and mediæval monuments, a theological seminary, a Piarist college with a gymnasium, and other schools and charitable institutions. There is a considerable trade in wine. Waitzen is one of the earliest Magyar settlements. The Turks were defeated here in 1597, and decisively in 1684 by Charles of Lorraine, who took the town. Görgey defeated the Austrians at Waitzen on April 10, 1849, and had a bloody conflict here with the Russians under Paskevitch on July 15.

WAKE (Anglo-Sax. *wæc*), a holiday festival once universally celebrated in the country parishes of England. Wakes originated at the period of the conversion of the Saxons to Christianity, and were established to commemorate the birthday of the saint to whom a particular church was dedicated, and the anniversary of the dedication. As the ecclesiastical day was then reckoned from sunset to sunset, the festival began on the evening previous to the day itself, and during the night the people customarily performed their devotions in the churches, whence the name wake. Wakes gradually became the occasions of boisterous and even licentious merrymakings; and where the saint was of high repute, the inhabitants of neighboring parishes flocked in large numbers to his annual festival. In 1536 Henry VIII. by an act of convocation ordered the festival of the saint's day to be discontinued, and that of the dedication of the church to be celebrated in all the parishes on the first Sunday of October. This gradually fell into desuetude, the saint's day being the more popular festival, and the latter still subsists in the form of a village wake.—In Ireland, upon the death of one in humble circumstances, the body, laid out and covered with a sheet, except the face, and surrounded by lighted tapers, is "waked" by the friends and neighbors. After vociferous lamentations, food and whiskey are indulged in, commonly leading to noisy and even riotous demonstrations. All the efforts of the Roman Catholic clergy toward the suppression of this pernicious custom have proved unavailing.

WAKE, a central county of North Carolina, drained by the Neuse and Little rivers; area, 1,010 sq. m.; pop. in 1870, 35,617, of whom 16,184 were colored. The surface is hilly and the soil fertile. Granite and plumbago are found. It is intersected by the North Carolina, the Raleigh and Gaston, and the Raleigh and Augusta railroads. The chief productions in 1870 were 60,596 bushels of wheat, 379,363 of Indian corn, 80,804 of oats, 12,204 of peas and beans, 10,365 of Irish and 99,976 of sweet potatoes, 136,857 lbs. of butter, 11,371 of wool, 96,874 of tobacco, 6,933 of rice, and 7,015 bales of cotton. There were 2,108 horses, 1,596 mules and asses, 9,544 cattle, 6,758 sheep, and 23,468 swine; 5 manufactories of carriages and wagons, 1 of cars, 5 of iron castings, 2 of machinery, 1 of paper, 11 flour mills, and 8 saw mills. Capital, Raleigh, also the capital of the state.

WAKE, William, an English prelate, born in Blandford, Dorsetshire, in 1657, died at Lambeth, Jan. 24, 1737. He was educated at Oxford, became preacher to the society of Gray's Inn, and published in 1686 an "Exposition of the Doctrine of the Church of England," in answer to Bossuet's "Exposition of the Roman Catholic Faith." In 1689 he was made canon of Christ church, Oxford, in 1693 rector of St. James's, Westminster, and published "An English Version of the Genuine Epistles of the Apostolical Fathers" (new ed., 1860). On the controversy in regard to the convocation he published tracts in 1697 and 1698, and in 1703 a folio volume on "The State of the Church and Clergy in England." In 1701 he became dean of Exeter, in 1705 bishop of Lincoln, and in 1716 archbishop of Canterbury. Among his other works are "Preparation for Death," "The Authority of Christian Princes over their Ecclesiastical Synods asserted," and several volumes of sermons and charges.

WAKEFIELD, Gilbert, an English theologian, born in Nottingham, Feb. 22, 1756, died in London, Sept. 9, 1801. He graduated at Cambridge in 1776, obtained a fellowship, and in the same year published a volume of Latin poems. In 1778 he was ordained deacon, though he signed the articles with reluctance, and was appointed to a curacy in Stockport, and soon after in Liverpool. He vacated his fellowship by marriage in 1779, became in the same year classical master of a dissenting academy at Warrington, and published a series of writings involving attacks upon the doctrines of the established church. He made himself familiar with the Hebrew, Syriac, Chaldee, Samaritan, and other languages, and published in 1781 "A New Translation of the First Epistle of Paul the Apostle to the Thessalonians," "A Plain and Short Account of the Nature of Baptism," and an "Essay on Inspiration," and in 1782 "A New Translation of the Gospel of St. Matthew." After the dissolution of the academy of Warrington in 1783, he lived successively at Bramcote, Richmond, and Nottingham; published in 1784 the first volume of "An Inquiry into the Opinions of the Christian Writers of the three first Centuries concerning the Person of Jesus Christ;" and preached occasionally, till in 1786 he left the church and became its open assailant. He resided six years at Nottingham, instructing a few pupils, and producing among other works "Remarks on Dr. Horsley's Ordination Sermon" (1788); "Four Marks of Antichrist" (1788); "A New Translation of those parts of the New Testament which are wrongly translated in our Common Version" (1789); "Remarks on the Internal Evidence of the Christian Religion" (1789); *Silva Critica* (1st part, 1789; 4 other parts, 1790–'95), intended for the illustration of the Scriptures from the Greek and Roman writers; and "Cursory Reflections on the Corporation and Test Acts" (1790). In 1790 he was called to the classical professorship in the dissenting academy at Hackney, but resigned it in the following year. His subsequent works include a "Translation of the New Testament, with Notes" (2 vols., 1791; 2d ed., 2 vols., 1795); "An Enquiry into the Expediency and Propriety of Public or Social Worship" (1791); "Memoirs" of his life (1792), continued by Rutt and Wainewright (1804); and several pamphlets. He also edited numerous translations and editions of Greek and Latin classics. His "Reply to some Parts of the Bishop of Llandaff's Address to the People of Great Britain" (1798) occasioned a prosecution first of his publisher and then of himself, and caused his imprisonment for two years in Dorchester jail. His friends and partisans raised a subscription for him of about £5,000.

WAKEFIELD, Priscilla (TREWMAN), an English authoress, born at Tottenham, near London, about 1751, died in Ipswich in 1832. She published numerous works, chiefly educational and juvenile, including "Mental Improvement" (2 vols., 1794); "Leisure Hours" (2 vols., 1794); "Reflections on the Present Condition of the Female Sex, with Hints for its Improvement" (1798); "Domestic Recreation" (1805); "Sketches of Human Manners" (1807); "Instinct Displayed" (1811); and several volumes of descriptive geography. In 1798 she established at Tottenham a bank for the savings of women and children, which in 1804 was organized as a general savings bank, the first in Great Britain.

WAKE-ROBIN, one of the common names, especially in the southern states, for *arisæma triphyllum*, which is also called jack-in-the-pulpit and Indian turnip; and the name is also applied to species of *trillium*. (See TRILLIUM.) *Arisæma* belongs to the family *araceæ;* this includes endogenous plants with an acrid juice; the flowers in a fleshy head or spadix, which is usually surrounded or subtended by a large, showily colored or peculiarly shaped bract or spathe; the calla lily, or lily of the Nile (*Richardia*), a popular house plant, is a representative of this family. The arisæmas have a tuberous rootstock, or corm, from which rises a simple scape, which is sheathed by the stalks of one or two compound, veiny leaves, and bears a large greenish or purplish spathe, enclosing the spadix, at the base of which are clustered usually two kinds of naked flowers, which are sometimes in separate plants; the sterile flowers consist each of a cluster of anthers, and the pistillate, placed below the staminate, are reduced to a one-celled ovary, with a depressed stigma, which ripens into a one- or few-seeded red berry. There are three species in the United States; the one called wake-robin receives the specific name *triphyllum* from its three ovate, pointed leaflets; it usually has but two leaves, their stalks green or striped with purple. The spadix, mostly diœcious, is club-shaped, naked above, and included in the large spathe, which is incurved and hood-like above; it presents a great variety in color and markings, being sometimes pale green, more or less marked with purple, and sometimes dark purple with whitish stripes and spots. It is found over a wide extent of country, and extends even to South America. The corm, or "turnip," is flattened, an inch or two in diameter, brownish externally, and white and fleshy within; its taste is exceedingly acrid, producing when only touched to the tongue the sensation of scalding; this acridity is dissipated by heat and by long drying; the recently dried root, much less acrid than the fresh, is sometimes used as an expectorant and general stimulant of the secretions. From 10 to 17 per cent. of the corm is pure starch, which when separated is tasteless and may be used as a substitute for arrowroot; in England what is known as Portland arrowroot is made from a related plant, *arum maculatum.* —Another species of *arisæma* (*A. dracontium*) is known as green dragon, or dragon root; it is widely distributed, but less common, and its usually solitary leaf is 1 to 2 ft. long with 7 to 11 leaflets; the greenish, tube-like, pointed spathe is shorter than the spadix. A third species, *A. polymorphum*, found in the mountains of North Carolina, is much like the first named, but its solitary leaf has 3 to 5 leaflets, variable in shape and often lobed.

Wake Robin (Arisæma triphyllum).

WAKLEY, Thomas, an English physician, born at Membury, Devonshire, in 1795, died in the island of Madeira, May 16, 1862. He studied medicine in London, and began practice in 1817, but in 1823 retired and published the first number of a weekly medical journal, the "London Lancet," his main object in which was to correct deficiencies and introduce improvements in the various medical institutions of Great Britain. Among these improvements were the public reports of hospital cases and cliniques, the reform of the royal college of surgeons, and the introduction of medical men to the office of coroner. In 1839 he was elected coroner for Middlesex, which office he filled with great distinction. From 1835 to 1852 he was a member of parliament.

WAKULLA, a N. county of Florida, bordering on Appalachee bay, bounded W. by the Ocklockonee river, and E. by St. Mark's river; area, 504 sq. m.; pop. in 1870, 2,506, of whom 944 were colored. The surface is generally level and the soil fertile. It is intersected by a branch of the Jacksonville, Pensacola, and Mobile railroad. The chief productions in 1870 were 47,274 bushels of Indian corn, 8,726 of sweet potatoes, 2,800 lbs. of rice, 258 bales of cotton, 34 hogsheads of sugar, and 10,727 gallons of molasses. There were 184 horses, 1,617 milch cows, 2,605 other cattle, 299 sheep, and 3,800 swine. Capital, Crawfordville.

WALCHEREN, the westernmost island of the Netherlands, in the province of Zealand, in lat. 51° 30′ N., lon. 3° 30′ E., between the E. and W. mouths of the Scheldt; area, about 100 sq. m.; pop. about 40,000. It is surrounded by dikes, and is very fertile. The chief towns are Middelburg and Flushing (Vliessingen), the latter fortified. The Walcheren expedition of England against Napoleon, planned in 1807 by her continental allies, reached the Dutch coast only after many delays at the end of July, 1809; it consisted of 175 armed vessels and 41,000 soldiers. Lord Chatham, its chief commander, lost his time in the reduction of Flushing, which was not effected till Aug. 16, Antwerp, which had been intended as the main point of attack, being in the mean time reënforced and protected by Bernadotte. About 7,000 men died of malaria at Middelburg, and the island was finally evacuated before the end of the year.

WALCKENAËR, Charles Athanase, baron, a French author, born in Paris, Dec. 25, 1771, died there, April 27, 1852. He studied at Glasgow and Oxford; served as director of transportation in the army of the Pyrenees in 1793; afterward studied in the polytechnic school; and became a mayor of Paris in 1816, and prefect of the department of Nièvre in 1824 and of Aisne in 1826. In 1830 he finally left the public service, and in 1840 became perpetual secretary of the academy of inscriptions. He published *Essai sur l'histoire de l'espèce humaine* (1798); *Histoire abrégée des insectes des environs de Paris* (1802); *Tableau des aranéides* (1805); *Le monde maritime* (4 vols. 8vo, 1818); *Nouvelle collection des relations de voyage* (21 vols., 1826-'31); *Analyse géographique des itinéraires des anciens*, &c. (3 vols. 8vo, 1839); *Histoire de la vie et des poésies d'Horace* (1840); and *Mémoires sur Madame de Sévigné* (5 vols., 1842-'52, incomplete). A collection of his more important works has been published under the title *Œuvres choisies* (Paris, 1862 *et seq.*).

WALDECK, a principality in N. W. Germany, embracing Waldeck proper, which is situated between the Prussian provinces of Hesse-Nassau and Westphalia, and the county of Pyrmont, between Lippe-Detmold, Brunswick, and the Prussian provinces of Westphalia and Hanover; total area, 438 sq. m.; pop. in 1871, 56,224, of whom 49,136 were in Waldeck and the rest in Pyrmont, and chiefly Protestants. Waldeck proper is mountainous and woody, drained by the Eder and other small tributaries of the Weser, and possessing a poor and stony but carefully cultivated soil, and yields sufficient grain and potatoes for home consumption. Large flocks of sheep producing fine wool are raised, and butter and cheese are exported. There are mines of iron and copper, marble and alabaster quarries, and salt springs. Pyrmont consists of a small valley watered by the Emmer, and tolerably productive, but is principally noteworthy for the mineral springs at the fashionable watering place of that name. Waldeck is a constitutional principality, its present constitution dating from 1852. It has been since Jan. 1, 1868, under Prussian administration, to continue for a term of ten years, in accordance with the treaty of "accession" concluded July 18, 1867, and ratified by the principality on Oct. 22. The executive power is vested in the prince alone; the legislature consists of a single chamber of 15 members. Its revenue and expenditures were each estimated in 1875 at 1,571,690 marks; more than half of the total revenue is absorbed by the civil list of the reigning prince, George Victor (born Jan. 14, 1831). The public debt amounted in 1875 to 2,596,800 marks. The paper money (630,000 marks) was in process of withdrawal from circulation. The diet meets annually at Arolsen, the residence of the prince.—The princes of Waldeck trace their origin to Witikind. They were originally counts, but became princes in 1682. GEORGE FREDERICK (1664-'92) took service under the emperor Leopold I. in Holland, who made him prince of the empire and field marshal. He commanded the Franconian troops at the siege of Vienna by the Turks in 1683. Returning to Holland, he was appointed marshal general of the army of the United Provinces, and was defeated by Marshal Luxembourg at the battle of Fleurus in 1690. CHRISTIAN AUGUSTUS (born in 1744, died near Lisbon in 1798) early entered the service of Austria, rose rapidly in the army, distinguished himself against the Turks, was appointed lieutenant general in the war against France in 1792, lost an arm at the siege of Thionville, took part in 1793 in the attack on the lines of Weissenburg, and captured Fort Louis. In 1794 he became quartermaster general of Flanders, and in 1797 chief commander of the Portuguese army.

WALDECK, Jean Frédéric de, baron, a French artist, born in Paris, March 16, 1766, died there, April 30, 1875. He early visited South Africa, and subsequently went with the army to Italy and Egypt. He made archæological explorations in Chili and Guatemala in 1819, and long resided in Mexico. The French government in 1826 granted him a pension of 2,000 francs. In the last 40 years of his life he lived in Paris, and he retained his mental powers to the end. He published *Voyage ar-*

chéologique et pittoresque dans le Yucatan (Paris, 1837). Two of his Mexican pictures were exhibited in 1869, under the title of *Loisir du centenaire*. His age was contested, but he was generally regarded as a centenarian.

WALDENSES, or **Vaudois,** a Christian denomination in Italy. The name is commonly derived from Petrus Waldus, Peter Waldo, or Pierre de Vaux, an opulent citizen of Lyons (about 1170), who is regarded as their founder. Some, however, derive it from the Latin *vallis*, valley, so that it would denote "inhabitants of the valleys." Probably an opposition to the Roman Catholic church, not unlike the Waldensian or the kindred Albigensian movement, existed in some of the Alpine valleys long prior to the date just named. Petrus Waldus, by reading the Bible and the early church writers, conceived an ardent desire to bring back the church, which in her external appearance seemed to him utterly corrupt, to primitive and apostolical purity. He gave all his possessions to the poor, began preaching, and collected a body of associates, who were commonly called the "Poor of Lyons," Leonistæ (from the name of that city), Sabatati (from their wearing wooden shoes or sandals), or Humiliati (from their humility). The earlier Waldenses probably had no design of seceding from the general church; but when the archbishop of Lyons commanded them to be silent, and Pope Alexander III., disregarding their appeal, likewise forbade their meetings (1179), Waldus continued to preach, teaching that they must obey God rather than man; and in 1184 he and his followers were formally excommunicated by Pope Lucius III. His views spread in France, Italy, and Bohemia, and his adherents became especially numerous in Provence and in the valleys of Piedmont. In 1242 they were again condemned by the synod of Tarragona, and large numbers of them were put to death. Those living in the valleys suffered especially from persecution, and under Sixtus IV. a crusade was preached against them. In Bohemia they united mostly with the Hussites, especially the Taborites, and with the Bohemian Brethren. The persecution of the Waldenses of Piedmont continued with but rare interruptions throughout the 16th and 17th centuries. In 1686 they were attacked by a French and Italian army, the former under Catinat, sent by Louis XIV., who had just expelled the Protestants of France; 3,000 were killed, 10,000 imprisoned, and 3,000 of their children distributed in Catholic towns and villages. Indeed, till the present century, their history is mainly comprised in sufferings and death for conscience' sake. Several thousand left the valleys for Switzerland, Holland, Brandenburg, Hesse, and Würtemberg. In the last named country full freedom of religious worship was guaranteed to them, and they still exist in considerable numbers, forming part of the state church, but retaining their own rites. In 1690 the duke of Savoy invited the fugitives to return, but in 1730 they suffered from a new persecution. Napoleon gave to their clergy for their support landed property, of which they were again stripped after his fall; but the king of Sardinia, at the instance of the Prussian government, gave to each of their ministers a small fixed salary. About 1826 the Prussian government began to interest itself more actively in their behalf, and to aid them in the erection of churches and schools. Still they continued to be excluded from all civil and military offices till 1848, when Sardinia granted them full religious and ecclesiastical liberty and equality of civil and political rights with the Roman Catholics. Until 1848 they were confined to three retired valleys of the Cottian Alps, Lucerna, Perosa, and San Martino; but they have since organized new congregations in all parts of Italy. In 1848 Turin became the centre of many of their operations; but when all Italy was opened to them by the subsequent revolutions, they fixed upon Florence as the centre of their denomination, and consequently the theological seminary was removed thither in 1860, and the printing press with the publication of their peculiar organ in 1862. They have been especially active in the publication of religious books, and in 1861, in order to extend this field of their labor, an Italian evangelical publication society was formed. In 1873 they had seven professors in the theological seminaries of Florence and colleges of La Tour and Pomaret; a hospital at each of the last two places; a superior school for young men, a normal school, a grammar school at Pomaret, and 19 theological students at Florence. Four journals were published, three in Italian and one in French. In the beginning of 1876, according to a recent report, the Waldensian church in Italy, besides 16 parishes in the valleys, had 40 settled congregations, 10 missionary stations with 50 outposts occasionally visited, 20 ordained ministers, 10 licentiates, 14 schoolmaster-evangelists, 53 other teachers, 5 colporteurs, and 2,140 communicants. In Rome the Waldenses have an organization and a church edifice, and Sabbath and other schools. There is a Waldensian colony at Rosario in the Argentine Republic.—In doctrine and church constitution, the Waldenses approach nearest to the Reformed church of France. They recognize the Bible as their only rule of faith, and believe their "Confession of Faith" published in 1655 to be the most correct expression of Biblical theology. With regard to the Lord's supper they agree with the Calvinists, but they have not adopted the doctrine of absolute predestination. In their public services they use the Bible, and especially the Psalms. Their synod consists of all the ministers and twice their number of lay delegates, who however cast only an equal number of votes with the clergy. The meetings are annual. Each of their congregations has a consistory composed of the minister, an elder, and a deacon. Above these local consistories is a supreme consistory, called "the Table," and composed of three clergymen and two laymen. —On the history of the Waldenses, see Monastier, *Histoire de l'église vaudoise* (2 vols., Geneva, 1847); Baird, "The Waldenses, Albigenses, and Vaudois" (Philadelphia, 1848); Dieckhoff, *Die Waldenser im Mittelalter* (Göttingen, 1851); Muston, *L'Israël des Alpes* (4 vols., Paris, 1851), republished (1851) as *Histoire des Vaudois des valleés du Piémont et de leurs colonies depuis leur origine jusqu'à nos jours* (English translation by William Hazlitt, London, 1852, and by John Montgomery, 2 vols., Glasgow, 1857; German translation by Dr. J. F. Schröder, Duisburg, 1874); Herzog, *Die romanischen Waldenser* (Halle, 1853); and "Sketches of the Evangelical Christians of the Valleys of Piedmont" (anonymous, 12mo, Philadelphia, 1853).

WALDMÜLLER, Ferdinand Georg, a German painter, born in Vienna in 1793, died there, Aug. 23, 1865. He studied under Maurer and Sampi, painted portraits at Pesth, and afterward returned to Vienna. In 1820 he exhibited his "Peddlers of Turkish Pipes," followed by genre pictures relating to Austrian and Tyrolese peasantry and to children (1830–'50). His works also include "A Rabbi teaching a Girl," "A Child learning to Walk," "A Family of Tyrolese Peasants," "A Family of Itinerant Beggars," "The Convalescent's first Walk," "The Village School," "A Village Wedding in Lower Austria," "Going Home from the Harvest," "A Child's Sorrow," and "A Child's Piety."

WALDO, a S. county of Maine, bounded E. by Penobscot river and bay, and drained by St. George and Marsh rivers and affluents of the Sebasticook; area, 812 sq. m.; pop. in 1870, 34,522. The surface is undulating and the soil fertile. It has a large export trade, through Penobscot river and bay, in timber, lime, staves, &c. Cod and mackerel fishing is also carried on. The Maine Central railroad traverses it. The chief productions in 1870 were 1,943 bushels of wheat, 40,594 of Indian corn, 146,738 of oats, 78,791 of barley, 19,375 of peas and beans, 680,971 of potatoes, 876,494 lbs. of butter, 31,386 of cheese, 126,724 of wool, and 81,417 tons of hay. There were 5,116 horses, 8,861 milch cows, 14,511 other cattle, 31,343 sheep, and 3,064 swine. The whole number of manufactories was 374; capital invested, $705,110; value of products, $1,780,386. The chief establishments were 30 for the manufacture of carriages and wagons, 12 of clothing, 28 of cooperage, 4 of iron castings, 3 of fish oil, 1 of wrapping paper, 3 of sails, 2 of turned and carved wood, 5 flour mills, 9 tanneries, 3 currying establishments, 20 saw mills, 8 ship yards, and 6 wool-carding and cloth-dressing establishments. Capital, Belfast.

WALDO, Peter. See WALDENSES.

WALDOBOROUGH, a town and port of entry of Lincoln co., Maine, at the head of tide on Medomac river, 15 m. from the sea, and on the Knox and Lincoln railroad, about 50 m. N. E. of Portland; pop. in 1870, 4,174. Within the town limits are eight islands of considerable size, besides several smaller ones. The foreign commerce is small, but the coasting trade is considerable. A large amount of shipping is owned. Ship building is the chief industry. The town contains an iron foundery, a carding and fulling establishment, a carriage factory, two manufactories of brick, one of earthenware, two national banks, a weekly newspaper, a library, and six churches (Baptist, Congregational, and Methodist, two each). The town was first settled by German immigrants to the number of 1,500, the first of whom arrived in 1748, through the efforts of Samuel Waldo, who had obtained from George II. a grant of land of great extent called the Waldo Patent. It was incorporated in 1773.

WALES (Welsh, *Cumrie*, the land of the Cymri; Lat. *Cambria*), a principality of the British empire, occupying a large peninsula on the W. side of the island of Britain, and bounded N. by the Irish sea, E. by the English counties of Chester (Cheshire), Salop (Shropshire), Hereford, and Monmouth, S. by Bristol channel, and W. by St. George's channel. Its English name is supposed to be akin to the Saxon *wealh*, a foreigner, wanderer (Ger. *wallen*, to wander), to the name of the Swiss canton Valais or Wallis, once also the home of a Celtic people, and to *Wälschland*, the popular German name of Italy. Its length from N. to S. is 136 m. and its greatest breadth about 90 m. The coast line is about 360 m. long, exclusive of minor indentations. Its first indentation at the northeast is the estuary of the Dee; this is succeeded by Beaumaris bay, formed by the island of Anglesea, which is connected by Menai strait, separating the island from the mainland, with Carnarvon bay on the S. side of the island. Between Braich-y-pwll head and St. David's head is Cardigan bay, the largest on the coast. Other indentations are St. Bride's bay and Milford haven in Pembrokeshire, Carmarthen bay, Swansea bay, and the estuary of the Severn. The islands, besides Anglesea and the adjoining Holyhead or Holy island, which are described under their own titles, are Bardsey off the extremity of Carnarvon peninsula, Mochras in Cardigan bay, Skomer and Skokham off Pembrokeshire, Caldy in Carmarthen bay, and Barry in Bristol channel. The surface is almost all mountainous. The chief ranges are the Snowdon mountains in the north, which extend from near the mouth of the river Conway S. S. W. to Cardigan bay, and have several peaks more than 3,000 ft. high, Moel-y-Wyddfa, the highest, being 3,590 ft.; the Berwyn, S. of the Snowdon, the highest peaks of which are Arran Mowddwy and Cader Idris, the latter about 3,000 ft. high; the Plinlimmon, the natural boundary between North and South Wales, which reaches a height of 2,481 ft.; and the Black mountains, or Forest Fawr, in South Wales, the highest points of which, the Carmarthen and Brecknock Beacons, are respectively 2,596 and 2,862 ft. North Wales contains many picturesque valleys, but a large part of it is at a high elevation and unfit for cultivation. S. of the Plinlimmon range is an extensive and desolate mountain region, but E. and W. of it are beautiful and fertile valleys. In South Wales, on the S. side of the mountain system, is the plain of Glamorgan, the most fertile part of the country. The scenery of the Welsh mountains, which is noted for its picturesque beauty, attracts many visitors. Of the rivers of Wales, the Dee, Severn, Wye, and Usk flow into England. There are several smaller streams, of which the Clwyd flows into the Irish sea on the N. coast; the Dovey, Rheidol, Aeron, and Teifi into Cardigan bay; the Towy and Neath into Carmarthen bay; and the Taff into Bristol channel. The only lake of importance, Bala, is but 4 m. long. About two thirds of Wales, extending from the river Conway on the N. coast nearly to Carmarthen bay, belongs to the Silurian formation. All S. E. Wales is Devonian or old red sandstone, above which lie the coal fields of South Wales, the one occupying the greater part of Glamorganshire and a part of Carmarthen, and a narrower one crossing the Pembroke peninsula to St. Bride's bay. These coal measures are estimated to be from 7,000 to 12,000 ft. thick, with more than 100 coal beds, 70 of which are worked. Wales abounds in useful minerals of great variety. Anglesea is rich in copper and lead ores, the latter containing silver enough to render its extraction profitable. The Parys copper mine, which once produced annually 70,000 tons of ore, is now much less valuable. In Carnarvonshire are great quarries of slate, which employ many thousand hands. The gross value of the annual product of the Penryn quarries, under Snowdon, is £150,000. Denbighshire exports roofing slates, paving flags, and immense quantities of limestone to be used as a flux for blast furnaces in England. It has also beds of iron ore, coal, and lead. The adjoining county of Flint is rich in iron, zinc, lead, coal, and limestone. The lead-smelting works at Bagillt are among the most extensive in the world. Lead mines are worked in the N. E. part of Carmarthenshire. In the same part of Wales, 10 m. W. of Llandovery, are the gold mines of Gogofaw, which were worked by the ancient Romans. The galleries made by them in the rock are still to be seen, and there are traces of aqueducts, built probably to convey water to wash the gold, at the adjacent Roman station of Cynfil-Cays, where many gold ornaments have been found. These mines have not been worked in modern times. Other ancient gold mines are found in Merionethshire, N. of Dolgelly, which have been worked of late years. The lodes contain also small quantities of copper ore and galena. Glamorganshire is one of the richest of the mineral districts. Its coal field is almost inexhaustible. The anthracite coal occurs chiefly near Llanelly, and E. of it lie great deposits of blast coal. The collieries employ about 10,000 hands. Blackband ironstone is found at Cwm Avon and other places, and there are several great iron works, which employ more than 5,000 hands. Copper is extensively worked at Swansea, Michaelston, Neath, and Taebach, and tin at Aberavon, Cadoxton, and Treforest. Zinc, lead, manganese, gypsum, and firestone are also worked to some extent. The climate is moderate and equable, though somewhat cold and excessively humid; the average annual rainfall is 45·5 inches. The soil is fertile in the valleys, but often barren on the hills, though affording tolerable pasturage. The principal vegetable products are the cereals, grasses, and some fruits. Agriculture is backward, but gradually improving. The domestic animals are generally small, but of good quality. The Hereford cattle are preferred. A small active breed of ponies, the "Merlins," are reared in considerable numbers, and hardy sheep are raised in the mountain districts. In the vicinity of Cardiff, near Newport, and on the island of Anglesea, as well as in other parts of Wales, are numerous remains of the druidical age, called *cromlechs*, some of them of great extent and composed of stones of immense size; and evidences of the occupation of some portions of the country by the Romans are found in the ruins of camps, walls, &c., and in the Roman coins occasionally exhumed.—Wales is divided politically into 12 counties, whose area, population in 1861 and 1871, and capitals are as follows:

COUNTIES.	Area, sq. m.	POPULATION.		CAPITALS.
		1861.	1871.	
Anglesea......	302	54,546	51.040	Beaumaris.
Brecknock....	719	61,627	59,901	Brecon.
Carmarthen...	947	111,757	115,710	Carmarthen.
Carnarvon....	577	95,668	106,121	Carnarvon.
Cardigan......	693	72,255	73,441	Cardigan.
Denbigh......	613	100,862	105,102	Denbigh.
Flint.........	264	69,870	76.312	Mold.
Glamorgan....	855	317,751	397.859	Cardiff.
Merioneth	602	38,888	46,598	Dolgelly.
Montgomery..	758	67,075	67,623	Montgomery.
Pembroke....	615	96,093	91.998	Pembroke.
Radnor.......	432	25,403	25,430	New Radnor.
Total.......	7.377	1,111,795	1,217,135	

The other considerable towns are Merthyr Tydfil and Swansea in Glamorganshire, Haverford West in Pembrokeshire, Holyhead on Holyhead island, Llanelly, Welshpool, Wrexham, Bangor, Holywell, Llangollen, and Neath. The greater part of the inhabitants are of Celtic origin, and are called by their English neighbors Welsh, but by themselves Kymry or Cymri. In some of the larger towns are considerable numbers of English, and the English language is spoken in nearly all the towns, but the people of the rural districts adhere to the Welsh. (See CELTS, LANGUAGES AND LITERATURE OF THE, vol. iv., p. 178.) There is a small colony of Flemings in the district of Gower in the S. W. part of Glamorganshire, who settled there in the time of Henry I., and who still maintain their isolated condition, speaking the Flemish language, and rarely intermarrying with the Welsh. The Welsh are brave and generous, but irascible and impulsive, superstitious, and somewhat fanatical. They adhere with great tenacity to their national customs and traditions, and take much pride in their antiquity. A large part of the population are engaged in pastoral or agricultural pursuits, and the production of butter, cheese, wool, mutton, and grain is very large. The most important manufactures are those of iron in Glamorganshire, and those of flannel throughout the principality. The direct foreign commerce is not large, as its productions mainly pass through English ports. Cardiff, Swansea, Carmarthen, Pembroke, Milford, Cardigan, Holyhead, Beaumaris, Carnarvon, and Flint are ports of considerable importance. Most of the principal towns are connected by railway. Two of the chief lines are the Gloucester and Haverford West, passing through the southern tier of counties, and the Chester and Holyhead, following the northern shore from Chester, crossing the Menai strait by the Britannia tubular bridge, and terminating at the port of Holyhead on Holyhead island, the extreme N. W. point of Wales. Both lines have branches and connect by other railways with London. There are several canals in Wales: the Montgomery canal, 24 m. long, extending from Newton in Montgomeryshire to its junction with the Ellesmere canal in Shropshire; the Ellesmere and Chester canal, commencing in Denbighshire, and passing through Flintshire, Shropshire, and Cheshire to join the Mersey; and the Brecknock and Abergavenny canal, 35 m. long, which joins the Monmouth canal and connects through it with the Usk. The two former connect the Severn and the Mersey. The coach roads or turnpikes, especially the great highway from Shrewsbury to Holyhead, are excellent, but the roads generally are inferior to those in England. Education is still far below the standard of England or Scotland. There are nine collegiate institutions: University college, Aberystwith, with ten instructors; St. David's college, Lampeter, with six instructors; the Presbyterian college at Carmarthen; Independent colleges at Bala and Brecon; the Baptist college at Llangollen; St. Beuno's Roman Catholic college at St. Asaph; and the Calvinistic Methodist colleges of Bala and Trevecca. The people are almost entirely Protestants, and a majority of them dissenters. There are four episcopal sees in the principality, St. David's, Bangor, Llandaff, and St. Asaph's. Among the dissenting denominations, the Calvinistic Methodists, Baptists, and Presbyterians are most numerous. The Mormons have made a large number of converts in Wales.—When the Romans invaded Britain in A. D. 43 Wales was inhabited by a people of Celtic origin divided into three tribes. The Ordovices occupied the northern part and the island of Mona (Man), the Demetæ the western part, and the Silures the central and southern parts. The Silures were the most numerous and powerful. The country was repeatedly invaded by the Romans, and Caractacus, king of the Silures, was captured and carried to Rome. Though many times overrun, Wales was not subdued, and remained a place of refuge for those Britons who fled from the Roman rule. Many more fled thither from the invading Saxons, and, becoming incorporated with the original inhabitants, formed a people who have in many places preserved their language and customs to the present day. The origin of their name Kymry has been long discussed, but no generally admitted result has been attained. After the Romans abandoned Britain in the early part of the 5th century the Welsh were engaged with varying fortune in continued contests with the Saxons. In the latter part of the 8th century Offa, king of Mercia, constructed a dike, traces of which remain, from the mouth of the Dee to the Wye, as a defence against the Welsh. Wales was divided into a number of petty kingdoms, and was repeatedly ravaged by the Danes. During the 9th century it was nearly all brought under the dominion of Roderick the Great, who divided it into three principalities, Gwynedh (North Wales), Dyved (South Wales), and Powys, which on his death (about 875) he left to his three sons. About 930 Athelstan, king of England, reduced the country so far as to compel it to pay an annual tribute. About 940 it was again united under one king, Howel Dda ("the Good"), who reformed and digested its laws. On his death it was again divided, and from this time the Welsh people were continually engaged in war with the Danes and the English, or in civil strifes. Just previous to the Norman conquest they were compelled to pay tribute to King Harold. They refused the tribute to William the Conqueror, and he invaded the country and reduced them to submission. From this time the English kings claimed Wales as part of their dominions, but the claim was constantly resisted, and the country was also distracted by intestine warfare. In 1267 Llewellyn ap Gryffyth, having obtained the sovereignty of the greater part of Wales, and having defeated the English in battle and inflicted great damage on their territory, was acknowledged as prince of Wales by Henry III., and a treaty was concluded. In 1275 Edward I. summoned Llewellyn to a parliament at Westminster. Soon afterward Eleanor de Montfort, daughter of the earl of Leicester and betrothed to Llewellyn, was made prisoner by Edward when on her way to Wales. Llewellyn refused to comply with the summons unless she was released and hostages for his own safety were given. War immediately commenced, and Llewellyn was compelled to conclude a peace on humiliating terms, though Eleanor was released and married to him. In the spring of 1282 Llewellyn again rebelled, but in December was defeated and slain. His brother David, who succeeded him, was captured and executed as a traitor at Shrewsbury the next year; and by the statute of Rhuddlen (12 Edward I., c. 5) Wales was united to England. The title prince of Wales was given by Edward to his son, the future Edward II., who was born in Carnarvon castle, April 25, 1284, and has ever since been borne by the eldest son of the English sovereign. Rebellions against the English rule broke out in 1287, 1294, and 1315, but they were suppressed and their leaders executed. In 1400 the Welsh, led by Owen Glendower, made their last attempt to recover their independence. They maintained the struggle until his death in 1415. (See GLENDOWER.) The laws of Wales were now gradually assimilated to those of England, until in 1536, by the statute 27 Henry VIII., c. 26, the complete identity of the two countries in all essential points was established; and in the reigns of George IV. and William IV. the last traces of political distinction were abolished.

WALES, Language and Literature of. See CELTS, LANGUAGES AND LITERATURE OF THE.

WALEWSKI, Alexandre Florian Joseph Colonna, count and duke, a French statesman, born in the château of Walewice, Poland, May 4, 1810, died in Strasburg, Oct. 27, 1868. He was reputed an illegitimate son of Napoleon I. and the countess Walewska, after whose death he was sent to school at Geneva. In 1830 he went to Warsaw and fought with the patriots at the battle of Grochów, and was sent to London to solicit English intervention. After the fall of Warsaw he entered the French army as captain, and at the close of 1833 was naturalized in France. Subsequently he was employed on a confidential mission to Abd-el-Kader, and held an office at Oran. In 1838 he established in Paris the *Messager* newspaper, which in 1840 he sold to Thiers, who appointed him on a mission to Mehemet Ali. He continued in the diplomatic service under Guizot, being employed on various missions, and was attaché at Buenos Ayres at the outbreak of the revolution of Feb. 24, 1848. He then joined his intimate friend Louis Napoleon, who gave him in 1849 the mission to Florence, and subsequently sent him to Naples and England. In 1855 he entered the senate, succeeded Drouyn de Lhuys in the foreign office, and was one of the signers of the treaty of Paris of March 30, 1856. In January, 1860, he was succeeded by Thouvenel, but was made a member of the privy council, and on Nov. 24 minister of state. In January, 1862, he was chairman of the important committee relating to the copyright of authors and artists. After De Morny's death in 1865, having resigned his place in the senate, he succeeded him in the legislative body as member for the department of Landes, where he owned large property, and was its president till September, 1866. He also retired from the ministry and received the title of duke. In 1867 he was reinstated in the senate. In 1869 the emperor purchased Walewski's estates in Landes, and granted a pension of 20,000 francs to his widow. His son by the actress Rachel bears his name.

WALHALLA, or Valhalla. See MYTHOLOGY, vol. xii., p. 120, and RATISBON.

WALKER. I. A N. W. county of Georgia, drained by the Chattooga and Chickamauga rivers; area, 500 sq. m.; pop. in 1870, 9,925, of whom 1,529 were colored. It is traversed by Taylor's ridge, and contains Pigeon, White Oak, and Lookout mountains. The soil along the streams is very rich. Bituminous coal, marble, limestone, gypsum, and lead abound, and there are several fine mineral springs. Crawfish spring, 12 m. N. of the capital, affords water sufficient to float a steamboat within a short distance from the cavern from which it issues. The chief productions in 1870 were 107,901 bushels of wheat, 226,194 of Indian corn, 28,547 of oats, 4,903 of Irish and 18,022 of sweet potatoes, 71,837 lbs. of butter, 13,319 of wool, and 3,268 of tobacco. There were 1,608 horses, 1,933 milch cows, 2,949 other cattle, 5,673 sheep, and 12,413 swine. Capital, Lafayette. **II.** A N. W. county of Alabama, drained by Mulberry river and Lost creek, affluents of the Black Warrior, and by the Sipsy and Blackwater rivers; area, 828 sq. m.; pop. in 1870, 6,543, of whom 308 were colored. The surface is hilly and the soil in the valleys very fertile. Bituminous coal is found, and there is an abundance of choice timber. The chief productions in 1870 were 9,606 bushels of wheat, 158,810 of rye, 33,553 of sweet potatoes, 36,652 lbs. of butter, 3,242 of wool, and 1,213 of tobacco. There were 962 horses, 2,107 milch cows, 4,073 other cattle, 3,361 sheep, and 1,795 swine. Capital, Jasper. **III.** An E. county of Texas, bounded N. E. by Trinity river; area, 854 sq. m.; pop. in 1870, 9,776, of whom 5,823 were colored. The surface is level, and the soil a rich alluvium. It is intersected by the Houston and Great Northern railroad. The chief productions in 1870 were 186,401 bushels of Indian corn, 35,536 of sweet potatoes, 38,226 lbs. of butter, and 5,524 bales of cotton. There were 1,680 horses, 2,904 milch cows, 9,606 other cattle, 2,551 sheep, and 8,126 swine; 3 saw mills, 1 cotton mill, and 1 woollen mill. Capital, Huntsville.

WALKER, Amasa, an American political economist, born in Woodstock, Conn., May 4, 1799, died at North Brookfield, Mass., Oct. 29, 1875. He was a merchant in Boston from 1825 to 1840, and was prominent as an abolitionist. In 1843 and 1849 he went to Europe as a delegate to the international peace conventions. In 1848 he was a representative in the legislature, in 1849 a state senator, in 1851–'2 secretary of state, in 1853 a member of the state constitutional convention, and in 1862–'3 a member of congress. From 1842 to 1849 he was professor of political economy at Oberlin college, and from 1861 to 1875 lecturer at Amherst college. He published "Nature and Uses of Money and Mixed Currency" (Boston, 1857); "Science of Wealth, a Manual of Political Economy" (1866; 7th ed., 1874); and with William B. Calhoun and Charles L. Flint "Transactions of the Agricultural Societies of Massachusetts" (7 vols., 1848–'54).—His son FRANCIS AMASA, born July 2, 1840, studied law, served in the civil war, was made brevet brigadier general in 1865, became chief of the bureau of statistics at Washington in 1869, superintendent of the census of 1870, Indian commissioner in 1871, and in 1872 professor of political economy and history in the Sheffield scientific school of Yale college. Besides the reports of the census (3 vols. 4to), he has published "The Indian Question" (Boston, 1873), and "The Wages Question" (New York, 1876), and compiled the "Statistical Atlas of the United States" (folio, 1874).

WALKER, Frederick, an English painter, born in London in 1840, died in 1876. He studied at the royal academy, furnished designs for illustrated works, and became in 1864 an associate and in 1866 a member of the old water-color society, and in 1871 an associate of the academy. His water-color paintings include "Philip in Church," "The Fairy," "The Housewife," "The Fishmonger's Shop," and "The Harbor of Refuge;" his oil paintings, "The Lost Woman" (1863), "The Bathers" (1867), "The Vagrants" (1868), "The Old Gate" (1869), "The Plough" (1870), "The Harbor of Refuge" (1872), and "The Right of Way" (1875). About 200 of his pictures were exhibited in London in 1876.

WALKER, James, an American clergyman, president of Harvard college, born in Burlington, Mass., then a part of Woburn, Aug. 16, 1794, died in Cambridge, Dec. 23, 1874. He graduated at Harvard college in 1814, studied theology in Cambridge, and from 1818 to 1839 was pastor of the Unitarian church in Charlestown. From 1831 to 1839 he was editor of the "Christian Examiner." He became Alford professor of moral and intellectual philosophy in Harvard college in 1839, and was president of the college from 1853 to 1860. He edited works by Reid and Stewart for the use of college students, and published a volume of sermons preached in the chapel of Harvard college (1861), "Memoir of D. Appleton White" (1863), and a "Memoir of Josiah Quincy" (1867). A volume of his posthumous discourses was published in 1876. He left his valuable library and $15,000 in money to Harvard college.

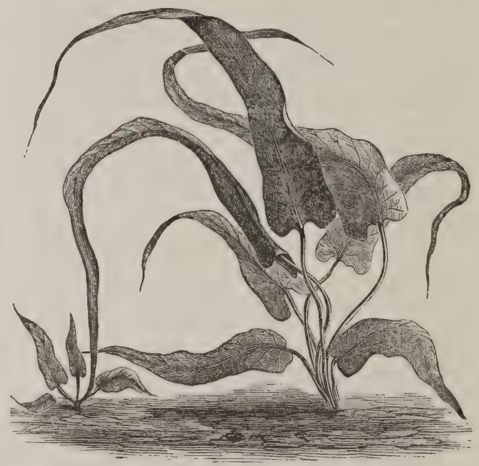
WALKER, John, an English lexicographer, born at Colney-Hatch, Middlesex, March 18, 1732, died in London, Aug. 1, 1807. He was successively a merchant, actor, and teacher. In 1769 he began to teach elocution, in which he soon gained a wide celebrity. In 1772 he published "A General Idea of a Pronouncing Dictionary of the English Language;" in 1775 a rhyming dictionary, first published under the title of "A Dictionary of the English Language, answering at once the purposes of Rhyming, Spelling, and Pronouncing;" in 1781 "Elements of Elocution;" in 1783 "Hints for Improvement in the Art of Reading," a pamphlet, most of which was incorporated in the "Rhetorical Grammar" (1785); in 1787 a small treatise entitled "The Melody of Speaking delineated, or Elocution taught like Music by Visible Signs;" in 1791 his chief work, the "Critical Pronouncing Dictionary and Expositor of the English Language," which for many years was the general standard; in 1798 a "Key" to the pronunciation of Greek, Latin, and Scripture names; and in 1805 "Outlines of English Grammar." Mr. Walker was brought up as a Presbyterian, but died in the Roman Catholic faith.

WALKER, Robert James, an American statesman, born in Northumberland, Pa., July 19, 1801, died in Washington, D. C., Nov. 11, 1869. He graduated at the university of Pennsylvania in 1819, and was admitted to the bar at Pittsburgh in 1821. In 1826 he removed to Natchez, Miss., and joined the democratic party there. He was a United States senator from 1837 to 1845, when he was appointed secretary of the treasury by President Polk, retiring in 1849. He was the principal author of the revenue tariff of 1846. In 1857–'8 he was governor of Kansas territory, which office he resigned from opposition to the policy of President Buchanan; and on the outbreak of the civil war in 1861 he declared strongly for the Union. In 1863–'4 he was financial agent of the United States in Europe, effecting the sale of $250,000,000 of U. S. bonds. He published "Reports of the Supreme Court of Mississippi, 1818–'32" (1834); "Argument on the Mississippi Slave Question" (1841); and four pamphlets on the finances and resources of the United States (London, 1863–'4).

WALKER, Sears Cook, an American mathematician, born in Wilmington, Mass., March 28, 1805, died in Cincinnati, Jan. 30, 1853. He graduated at Harvard college in 1825, taught school for several years near Boston and in Philadelphia, and actively engaged in scientific labors. His parallactic tables, first prepared in 1834 for the latitude of Philadelphia, greatly reduced the time needed for computing the phases of an occultation. In the "Memoirs of the Philosophical Society" (new series, vol. i.) he published a long series of observations of occultations. In 1837 he prepared a plan for the organization of an observatory in connection with the Philadelphia high school, which was one of the earliest built in America. (See OBSERVATORY, vol. xii., p. 567.) In 1841 he published a valuable memoir on the periodical meteors of August and November. In 1845 he received an appointment in the Washington observatory, where on Feb. 2, 1847, four months after the detection of the planet Neptune, he made the discovery that a star observed by Lalande in May, 1795, must in fact have been this planet. The prediction consequently made, that the recorded star would not be found in the heavens, was confirmed by Prof. Hubbard. The same discovery was made independently in Europe a few weeks later by an actual examination of the heavens through 270 square degrees, and confirmed by an examination of the original manuscripts of Lalande. From 1847 till his death Mr. Walker had charge of the longitude computations of the United States coast survey. With Prof. Bache he developed the method of determining differences of longitude by telegraph, which was put into successful operation in 1849.

WALKER, William, an American adventurer, born in Nashville, Tenn., May 8, 1824, executed at Trujillo, Honduras, Sept. 12, 1860. He studied both law and medicine, was a journalist in New Orleans and San Francisco, and practised law in Marysville, Cal. In July, 1853, he organized an expedition for the conquest of Sonora, but failed for want of supplies, after taking possession of Lower California, and surrendered himself to the United States officials at San Diego. In May, 1854, he was tried at San Francisco for violation of the neutrality laws, and was acquitted. In 1855 some American speculators in Nicaragua induced Walker to interfere in the intestine troubles of that country, ostensibly in aid of the democratic party. He landed at Realejo on June 11 with 62 followers, was joined by a few natives, fought successfully at Rivas and Virgin bay, took possession of the city of Granada on Oct. 15, and by a treaty with Corral, the opposing leader, was made generalissimo. Corral was tried for treason by a court martial over which Walker presided, and shot Nov. 8. Recruits came from the United States, and on March 1, 1856, Walker had 1,200 men. War breaking out with Costa Rica, he was defeated at Guanacaste on March 20, but had the advantage in a second battle at Rivas on April 11, and hostilities ceased. He now broke up the interoceanic transit route by confiscating the property and revoking the charter of the Vanderbilt steamship company. In June he caused himself to be elected president, and in September annulled by a decree the existing prohibition of slavery. His arbitrary acts provoked a domestic insurrection, which was seconded by several surrounding states and by agents of the Vanderbilt company; and after a series of battles, on May 1, 1857, he delivered himself up with 16 of his officers to Commander C. H. Davis of the United States sloop of war St. Mary's, by whom he was conveyed to Panama. Thence he went to New Orleans, where he was put under bonds to keep the peace; but in November he was once more in Nicaragua. In December Commodore Paulding, U. S. N., compelled him and his 132 men to surrender, and carried them to New York; but President Buchanan's government declined to recognize Walker as a prisoner, on the ground of the illegality of his arrest on foreign soil. In October, 1858, he sailed with a new expedition from Mobile, in a vessel without a clearance, but was arrested at the mouth of the Mississippi, tried at New Orleans, and acquitted. In June, 1860, he sailed with a small force from New Orleans to Trujillo, with the design of making a revolution in Honduras. He failed, and was captured and shot. He published "The War in Nicaragua" (Mobile, 1860).

WALKING LEAF, the common name for a North American fern, also called walking fern. It was formerly classed as *asplenium rhizophyllum*, which name it still retains in European catalogues, but it is now placed in a separate genus; the *sori* or fruit dots often come together in pairs and are confluent where they meet, appearing like one long fruit dot bent upon itself; on this account it is called *camptosorus* (Gr. καμπτός, bent, and σωρός, a heap), retaining the same specific name. It is one of the rare, or rather local ferns, found from New England westward to Wisconsin, and southward along the mountains to Georgia, on moist, shady, and usually limestone rocks. The evergreen fronds grow in tufts and are from 4 to 9 in. long, with a long stipe (like a leaf stalk), lanceolate, with a heart-shaped, auricled, or halberd-shaped base, and tapering above into a very long, slender, almost filiform point; the upper surface dark green and smooth, the under side netted with veins, to which are attached the long fruit dots, either singly or together in the manner already described. The tips of the attenuate fronds often strike root where they touch the ground, and new fronds are formed at some little distance from the old



Walking Leaf (Camptosorus rhizophyllus).

plant, and these in turn form other plants; hence the common name, and the specific name, *rhizophyllus;* the plant often forms dense tangled masses. It may be cultivated if its natural locality is imitated.

WALLACE, a W. county of Kansas, bordering on Colorado, and drained by the Smoky Hill river and its branches; area, about 2,000 sq. m.; pop. in 1870, 538. It is traversed by the Kansas Pacific railroad. The surface consists of elevated prairies. Capital, Wallace.

WALLACE, Alfred Russel, an English naturalist, born at Usk, Monmouthshire, Jan. 8, 1822. He was employed for several years in the architectural office of his brother, and then devoted himself to natural history. In 1848 he accompanied Mr. H. W. Bates in a scientific expedition to Brazil, where, after a protracted sojourn in Pará, he explored the primeval forests of the Amazon and Rio Negro, returning to England in 1852. His valuable collections, especially rich in the departments of ornithology and botany, were in great part destroyed by shipwreck. In 1853 he published "Travels on the Amazon and Rio Negro" and "Palm Trees of the Amazon and their Uses," and in 1854 undertook a journey to the East Indies, where for a period of nearly eight years he explored the greater part of the islands constituting the Malay archipelago, and portions of Papua. While pursuing his researches relative to the fauna and flora of these regions, Mr. Wallace, unaware of Darwin's previous labors in the same direction, attempted the solution of the problem of the origin of species, and arrived at almost the same general conclusions which were simultaneously reached by that naturalist. (See EVOLUTION.) His paper "On the Tendency of Varieties to depart indefinitely from the Original Type," transmitted through Sir Charles Lyell to the Linnæan society, was read before that body on July 1, 1858, coincidently with the reading of Mr. Darwin's paper "On the Tendency of Species to form Varieties, and on the Perpetuation of Species and Varieties by means of Natural Selection." Though recognizing the efficacy of natural selection in producing most of the changes attributed to its action by Mr. Darwin, he denies its competence to effect, without the joint agency of some higher cause, the transition to man from the anthropoid apes. In 1862 Mr. Wallace returned to England, where for several years he was mainly engaged in the classification of his vast collection, which embraced upward of 100,000 entomological specimens, and more than 8,000 birds. The results of his eastern explorations were partially embodied in "The Malay Archipelago: the Land of the Orang-utan and the Bird of Paradise" (1869). Mr. Wallace has of late been prominently associated with the believers in the so-called spiritualistic phenomena, to the examination of which he has devoted special attention. His observations were published in a series of essays in the "Fortnightly Review" for 1874, reprinted as "Miracles and Modern Spiritualism" (1875). In 1868 he received the royal medal from the royal society, and in 1870 the gold medal from the geographical society of Paris. In 1870 he published "Contributions to the Theory of Natural Selection." His elaborate work "On the Geographical Distribution of Animals" (2 vols.) appeared in 1876 in English, French, and German.

WALLACE, Horace Binney, an American author, born in Philadelphia, Feb. 26, 1817, died in Paris, Dec. 16, 1852. He graduated at Princeton college in 1835, and studied law, but never practised. In connection with Judge Hare he edited and annotated "American Leading Cases," "Smith's Leading Cases," and "White and Tudor's Leading Cases in Equity," which have passed through numerous editions. He published anonymously "Stanley, or the Recollections of a Man of the World," a novel (Philadelphia, 1838); and after his death were published "Art and Scenery in Europe, with other Papers" (1855), and "Literary Criticisms, and other Papers" (1856).

WALLACE, Sir William, a Scottish patriot, born about 1270, executed at Smithfield, Aug. 23, 1305. He was of Anglo-Norman descent, the younger son of Sir Malcolm Wallace, knight of Ellerslie. While at the high school in Dundee, in an altercation he stabbed the son of the English governor of Dundee castle, and fled. For some time he was an outlaw in the fastnesses of the southern highlands; and his accomplishments, personal prowess, and bravery drew around him a considerable number of followers, including several men of note. After the insurrection broke out in 1297, he attacked the English justiciary holding court at Scone, took many prisoners, and killed many more. At the same time Sir William Douglas and others of his adherents surprised and compelled the surrender of the English garrisons in the castles of Durisdeer and Sanquhar. Edward I. sent into Scotland an army of 40,000 men with a small cavalry troop, under Sir Henry Percy and Sir Robert Clifford. The Scottish force had assembled at Lochmaben, and on the approach of the English a night attack was made by Wallace, who was forced to fall back toward Irvine in Ayrshire. Dissensions arose among the chiefs in the Scottish army, and a treaty was agreed upon. Wallace and Murray of Bothwell alone of the leaders protested, and retired into the northern counties, where they speedily recruited a powerful force, and surprised and captured the English garrisons at Aberdeen, Dunnottar, Forfar, and Montrose. Wallace had begun the siege of Dundee, when he heard of the advance of a powerful English army toward the river Forth in the direction of Stirling. He at once abandoned the siege, and, recruiting as he went, reached Stirling with 40,000 foot and 180 horse. The English, 50,000 foot and 1,000 horse, were under the command of the earl of Surrey. Several titled deserters from the Scottish army, who were with Surrey, were deputed to persuade Wallace to capitulate, a free pardon being offered unconditionally in the name of the English king. The terms were rejected, and a large portion of Surrey's force crossed the river and fought the great battle of Cambuskenneth or Stirling bridge, Sept. 10, 1297. From their advantageous position Wallace's men drove them back and pursued them to the border town of Berwick. King Edward's forces were almost completely cut to pieces, and Wallace, by general consent, in the absence of the lawful monarch (John, then in the tower of London), was declared guardian of the kingdom of Scotland. A severe famine following suggested the invasion of the northern counties of England. Wallace laid waste the country from the borders to Newcastle, and returned with his spoils, to attempt an organization of Scotland. Meanwhile Edward had raised an army of 80,000 infantry and 7,000 horse. A portion of this force landed by sea on the N. E. coast, and suffered a partial reverse; but the main body advanced northward from the border, and on July 22, 1298, came up with the Scottish forces near Falkirk, where a decisive engagement was fought, in which the army of Wallace was defeated with a loss, according to various historians, of 15,000. For several years after this Wallace carried on a guerilla warfare, and he also went to Paris to secure French intervention. In February, 1304, he was declared an outlaw. Large rewards were offered by Edward for his arrest, and he was ultimately betrayed by Sir John Menteith. The day after his arrival in London the form of a trial was gone through in Westminster hall; the prisoner, in derision of his pretensions to the throne of Scotland, being decorated with a crown of laurel. He was condemned to death, and the same day dragged at the tails of horses to West Smithfield, and there hung, drawn, and quartered. His head was set upon London bridge, and his limbs were exposed at Newcastle, Berwick, Perth, and Stirling.

WALLACE, William Vincent, an Irish composer, born in Waterford in 1815, died at the château de Bayen, Haute-Garonne, France, Oct. 12, 1865. He received his earliest musical instruction from his father, a military band master, and at the age of 15 could play on every instrument of the orchestra, and had written numerous compositions for military bands. As a performer on the pianoforte and violin he showed great excellence. At the age of 18, on account of failing health, he went to New South Wales, and was long engaged in agricultural pursuits. He gave his first concert at Sydney with great success, and thenceforth travelled extensively over the southern hemisphere, deriving large emoluments in the Spanish American cities from his performances on the violin and the pianoforte. After a professional tour in the United States he returned in 1845 to England, where his first opera, "Maritana," was produced with great success. He then produced in rapid succession "Matilda of Hungary," "The Maid of Zürich," "Gulnare," and "Olga," several of which were performed in Germany and elsewhere in continental Europe. In 1849 he was commissioned to write an opera for the grand opera of Paris, but had scarcely begun the work when he became blind. For the purpose of recovering his eyesight he made a voyage to Rio de Janeiro, whence in 1850 he came to the United States. Several years later he returned to England, where in 1854 his "Lurline" and in 1861 his "Amber Witch" were brought out. In 1862 he produced "Love's Triumph," and in 1863 "The Desert Flower."

WALLACHIA (Ger. *Walachei;* Wallach. *Tzare Romanesca;* Turk. *Ak-Iflak*), a country of S. E. Europe, constituting with Moldavia the principality of Roumania, of which it is the larger part, tributary to Turkey. It is situated between lat. 43° 38′ and 45° 48′ N., and lon. 22° 20′ and 28° 12′ E., and is bounded N. by Transylvania and Moldavia, E. and S. by Bulgaria, and W. by Servia and Hungary; area, 28,373 sq. m.; pop. about 3,000,000, of whom about four fifths are Wallachs or Roumans, and the remainder include Greeks (chiefly at Braila), Germans (chiefly at Bucharest), Armenians, Hungarians, Serbs, Russians, gypsies, and Jews. The Carpathian mountains separate it from Hungary and Transylvania, and the Danube from Bulgaria and Servia. It is divided into Great and Little Wallachia, which are subdivided into 17 districts. The capital is Bucharest, which is also the capital of Roumania. Braila is the chief port, and among other larger towns are Ployeshti, Giurgevo, and Krayova. The Danube forms five eighths of the frontier, and the whole country is drained by its tributaries, of which the principal are the Sereth, Buseo, Yalomit͡za, Arjish, Vede, Aluta, which divides Little (or western) from Great Wallachia, and Shyl, all navigable. In the lower portion of the country are marshy lakes, formed by branches of the Danube. Spurs of the Carpathian mountains stretch toward the Danube with wide valleys between. On approaching that river the country becomes flat and is subject to inundation. The mountains are palæozoic; the country lying in the basin of the Danube belongs to the tertiary series. The soil, except on the mountains, is of extraordinary fertility and well adapted to grain. The mountainous districts afford excellent pasturage for sheep, good timber abounds in the forests, and the level lands yield a rich grass. The temperature is subject to great and sudden changes. There are properly but two seasons, a winter of five months, during which the ground is almost constantly covered with snow, and a summer of seven months, intensely hot. The cold of winter is sometimes as low as −20° F., and the heat of summer nearly as high as 100°. The vegetable productions include wheat, barley, flax, hemp, rye, maize, peas, beans, and tobacco. The vine flourishes, and some of the wine is excellent. The species of buckthorn yielding the French or yellow berry (*rhamnus infectorius*) grows abundantly, and the berries are exported for dyeing. Copper, mercury, gold, silver, iron, lead, rock salt, alum, bitumen, and marble abound; but the great mineral resources are little developed. Among animals are the wild boar, bear, badger, marten, wolf of great ferocity, fox, wild cat, several species of hare, beaver, squirrel, fallow deer, antelope, and chamois. There are many varieties of singing birds, on the rivers wading and aquatic birds, and in the mountains the partridge, buzzard, and other game birds. Fish are plentiful. Grain, cattle, sheep, goats, and horses are largely exported. The Greek church predominates, and is under the authority of the metropolitan at the capital and of a bishop in each province. The state university is at Bucharest, and there are in Wallachia numerous schools, education being much improved. The completion in 1869 of the railway from Bucharest to Giurgevo, which connects with the Bulgarian line from Rustchuk to Varna, was followed by other lines connecting with Moldavia, Austria, and Russia. The entrances at Braila in 1874 were 3,629 vessels, of 634,657 tons, and the clearances 3,517, of 618,304 tons. In 1876 the Roumanian legislature provided for the establishment of an exchange at the capital.—The early history of Wallachia is almost identical with that of Moldavia (see Dacia, and Moldavia) till near the close of the 13th century, when Radu the Black of Transylvania gradually became master of the country, and it remained a separate state despite Hungarian encroachments. Under Marcus I. (Mircea), hospodar or prince from 1383 to 1416, the Turks were pursued to the walls of Adrianople; but in 1391 he was obliged to acknowledge Sultan Bajazet as his suzerain, Wallachia retaining under the capitulation its autonomy as a tributary state of Turkey. Vlad III. concluded in 1460 a second series of capitulations with Mohammed II., and the two compacts formed the main basis of subsequent treaties affecting the regulations with the Porte down to those of Paris of 1858. Michael the Brave (1593–1601) united Wallachia with Moldavia and invaded Transylvania, but was assassinated during his negotiations with Austria aiming at the foundation of a Dacian realm of the extent of the ancient Roman province; and his successor retained only Wallachia. The hospodars were elected by the people in accordance with the capitulations till the close of the 17th century, when the Porte began to make arbitrary appointments, first of Roumans and after 1716 of Fanariotes, who remained in power till 1821, except during the Russian occupations of 1770–'74, 1788–'91 (jointly with Austria), and 1809–'12. The deplorable rule of the Fanariote hospodars, whose appointment was generally venal, was not broken up until the outbreak in 1821 of the movement projected by the Hetæria, the secret society for promoting Greek independence, which began in the Danubian principalities. Alexander Ypsilanti, whose father and grandfather had been hospodars of Wallachia, was the leader of this movement. His principal follower in Wallachia was Theodore Vladimiresco, who however opposed both Russian and Greek supremacy, and advocated national independence. His enemies put a violent end to his life, and the Porte, after quelling the insurrection, appointed a Wallachian as hospodar in 1822, to reconcile the people. The Russians reoccupied Wallachia in 1828 during their war with Turkey; they evacuated it in 1829, but the treaty of Adrianople, which fully restored the ancient capitulations, gave to Russia a protectorate over the country. A constitution was framed under Russian auspices, but its provision for the popular election of a prince was set aside in 1834, when Alexander Ghika was selected. He was deposed in 1842, on account of his complicity with Russian reactionary measures. His successor, George Demetrius Bibesco, was overthrown by the rising in 1848, when Bratiano and other patriots attempted to form a government; but the movement was suppressed by Russian and Turkish forces. The constitution was abolished from 1849 to 1856, and Bibesco's brother, Barbo Demetrius Stirbey, appointed hospodar. He withdrew from Bucharest during the Russian invasion of 1853–'4, and Alexander Ghika directed affairs until the speedy organization of a committee of three members for the formation of a government and the election of a prince, in accordance with the terms of the convention of Paris of Aug. 19, 1858. Alexander Cuza, then minister of war, and since Jan. 17, 1859, prince of Moldavia, became on Feb. 5 also prince of Wallachia and the first ruler of the united principalities, under the title of prince of Roumania. (See Alexander John I.) The union, recognized by the Porte in 1860, was proclaimed by Prince Alexander, Dec. 23, 1861. (See Roumania.)—See Engel, *Geschichte der Moldau und Walachei* (2 vols., Halle, 1804); Dickinson, "Account of the Principalities of Wallachia and Moldavia" (London, 1820); Neigebaur, *Die Donaufürstenthümer* (3 parts, Breslau, 1854–'6); Edgar Quinet, *Les Roumains, réorganisation des provinces danubiennes* (Paris, 1857); and Rösler, *Die Anfänge des walachischen Fürstenthums* (Vienna, 1867).

WALLACHIAN LANGUAGE AND LITERATURE. Wallachian is spoken in Wallachia and Moldavia (the modern Roumania), in a large portion of Transylvania, in the adjacent districts of Hungary, and in Bessarabia, and S. of the Danube in parts of ancient Thrace and Macedonia, and even as far as Thessaly. The number of people speaking the language is estimated at about 8,000,000. The name is of foreign origin, probably German (Serb. *Vla*, Hung. *Oláh*), and corresponds to the German

Wälsch, designating the Romanic languages in general. The Wallachs call themselves Romans (*Romeni*, *Romuni*), and their language Roman (*Romenie*, *Romunie*). The grammatical construction and material composition of the language still testify to its Latin extraction; but it is only recently that the majority of scholars have agreed upon classing it with the Romance languages, by the side of French, Provençal, Portuguese, Spanish, Romansh, and Italian. In Adelung's *Mithridates* it was still made to occupy a place of its own, with the name of Romano-Slavic, and Vater and Raynouard were the first to place it in the list of Romance languages. The objection to this classification is mainly on the ground that Romance tongues are understood to be languages derived from the Latin and mixed with Germanic as well as Celtic elements, while Wallachian has embodied hardly any German.—It is supposed that the early population of Dacia were of Thracian descent, and spoke a language closely allied to the ancient Illyrian, which was probably related to Greek, and is now represented by the Albanese. The influx of Jazyges and other barbarians, and of Roman emigrants in the 2d century of our era, when Dacia became a Roman province, totally changed the original character of the language. About the 6th century there was a large influx of Slavs, remodelling the language anew, and pushing the population further north and south. Thus hardly half of the language, in its present form, is of Latin derivation, and the roots of the other words are to be found in Slavic, Albanese, Greek, Turkish, Hungarian, German, and other languages. The German element is quite insignificant, and is due in part to the vicinity of the ancient Goths. The Danube now divides the language into the northern or Daco-Romanic and the southern or Macedo-Romanic, which has remained a mere popular dialect, and taken up a large amount of Albanese and Greek, and proportionally little of Slavic elements. The Wallachs, or Roumans, as they are now more properly designated, use the Latin as well as the Cyrillic alphabet, which they obtained from the Bulgarians. Among the principal features of the language are the following: The substantives, as in Italian, are indeclinable excepting a change of terminations which forms the plural: *domnu*, master, *domni*, masters. The article, which is appended to the substantive, forms the cases, thus: *domnu'l*, the master, *a domnu'lui*, the master's, *domnu'lui*, to the master, &c. There are two genders, masculine and feminine. The declension of the pronouns is very irregular. The conjugation is similar to the Italian, as (*eu*) *cuntu*, I sing, (*tu*) *cúntzi*, (*el*) *cúnte*, (*noi*) *cuntêm*, (*voi*) *cuntátzi*, (*ei*) *cúnte*.—The earliest literary monument so far discovered is a large historical fragment of the year 1495. The literature of the following century is principally theological, but the Bible was not translated before 1643, when it was ordered to be done by the Transylvanian prince George Rákóczy. In recent times quite an array of learned and poetical works has been produced, and the late political movements have led to the establishment of several newspapers. Minor works, mostly political, are rapidly increasing in number, but nothing noteworthy from a purely literary point of view has appeared, though Assaky, Rosetti, Bolintineano, Alexandresco, Negri, Sion, Negrutzi, Alexandri, and others have recently published some very promising poems and romances.—See Körnbach, *Studien über dako-romänische Sprache und Literatur* (Vienna, 1850); Miklosich, *Die slavischen Elemente im Rumunischen* (Vienna, 1861); Rösler, *Dacier und Romänen* (Vienna, 1866); and Diez, *Grammatik der romanischen Sprachen* (3d ed., Bonn, 1870–'72).

WALLACK. I. James William, an American actor, born in London, Aug. 24, 1795, died in New York, Dec. 25, 1864. Sheridan early engaged him for Drury Lane theatre. At 18 he played Laërtes to Elliston's Hamlet, and at 22 was the Iago to Edmund Kean's Othello. He sailed for the United States in 1818, and on Sept. 7 made his first appearance in New York in the Park theatre, as Macbeth. He became stage manager of Drury Lane theatre in 1820, several times revisited the United States, and in 1837 opened the National theatre in New York, and managed it till it was destroyed by fire in 1839. In 1852 he opened "Wallack's lyceum" (afterward Wallack's theatre), in Broadway and Broome street, and in the autumn of 1861 "Wallack's theatre," which he built in Thirteenth street and Broadway. He was a superior comedian, and excelled in such parts as Benedick, Mercutio, Rob Roy, Charles Surface, Martin Heywood, and Master Walter. **II. John Lester,** an American actor, son of the preceding, born in New York, Jan. 1, 1819. He made his first appearance on the stage in the Broadway theatre, New York, at its opening, Sept. 27, 1847, as Sir Charles Coldstream in the farce of "Used Up." For several seasons he was known as "J. W. Lester." He was a prominent member of Burton's company in the Chambers street theatre from 1850 to 1852, when he became stage manager in his father's theatre, at the same time playing the leading parts. On the death of his father he became proprietor of the theatre, which he still manages (1876). He has written "Rosedale" and other popular plays, and has translated several French comedies.

WALLA WALLA, the S. E. county of Washington territory, bounded N. by the Snake river, E. by Idaho, from which it is separated by the Snake, S. by Oregon, and W. by the Columbia river; area, 3,500 sq. m.; pop. in 1870, 5,300. There are many broad valleys and fertile plains, with abundant timber. The valley of Walla Walla river covers a considerable area, and is very fertile. The Blue mountains cross the E. end. The chief productions in 1870 were 110,905 bushels of wheat, 19,658 of Indian corn, 94,528 of oats, 17,459 of barley, 31,184 of potatoes, 31,440 lbs. of wool, 75,634 of butter, and 5,123 tons of hay. There were 5,741 horses, 651 mules and asses, 4,742 milch cows, 8,211 other cattle, 6,649 sheep, and 4,729 swine; 1 manufactory of bagging, 5 of saddlery and harness, 2 of sash, doors, and blinds, 4 of tin, copper, and sheet-iron ware, 6 flour mills, 1 distillery, 2 breweries, and 2 saw mills. Capital, Walla Walla. Toward the close of 1875 Columbia co. was formed from the E. portion of Walla Walla co. as above described.

WALLA WALLA, a city and the county seat of Walla Walla co., Washington territory, in the valley of Walla Walla river, 32 m. E. of Columbia river, 220 m. E. S. E. of Olympia, and 610 m. N. N. E. of San Francisco; lat. 46° 5′ N., lon. 118° 22′ W.; pop. in 1870, 1,394; in 1875, locally estimated at 4,500. It is regularly laid out, and has wide streets. The surrounding country is fertile, and the climate is mild. The Walla Walla and Columbia railroad connects with the Oregon steam navigation company's boats on the Columbia river for Portland, to which point considerable shipments of grain, fruit, cattle, and hides are made. A line of mail stages connects with the Central Pacific railroad at Kelton, Utah, 385 m. S. E. The city contains three door and sash and planing mills, a bag factory, a foundery, and four flour mills. There are two private banks, two public schools, a library, a semi-weekly and two weekly newspapers, and six churches (Congregational, Cumberland Presbyterian, Methodist, Roman Catholic, Seventh-Day Adventist, and United Brethren). Walla Walla was laid out in 1857, and incorporated in 1862.

WALLENSTEIN (properly WALDSTEIN), **Albrecht Wenzel Eusebius von,** count, and duke of Friedland, Mecklenburg, and Sagan, an Austrian general, born at the family estate of Hermanitz (according to some, in Prague), Bohemia, Sept. 14, 1583, assassinated at Eger, Feb. 25, 1634. He was brought up as a Protestant, and sent to the school in Goldberg, Silesia. At his father's death he was taken into the family of his uncle Albrecht von Slavata. He afterward studied at the Protestant university of Altdorf and at the Jesuit academy of Olmütz, and law and astrology at Padua. It is not known precisely when and how he was converted to Catholicism. In 1606 he served with distinction under Basta against the Turks in Hungary. About 1607 he married a wealthy Moravian widow, much older than himself; and by her death in 1614 he became a prominent landowner. In 1617 he levied a troop of cavalry at his own expense, and relieved the town of Gradisca, then hard pressed by the Venetians. He affiliated with the clique that was striving to undermine Cardinal Klesel's power at Vienna and raise Ferdinand of Styria to the throne. He married a daughter of Count Harrach, and was made count and chamberlain. Klesel was removed from the privy council, and in 1619, on the death of Matthias, Ferdinand became emperor. Wallenstein had been appointed general of the forces in Moravia. Refusing to join the Bohemian insurrection, which opened the thirty years' war, his troops deserted him; but he carried off the military chest of 90,000 thalers, and with part of the money equipped a fresh regiment of cuirassiers. His regiment took part in the battle of the White mountain, near Prague, in 1620, but he himself was not present. This battle crushed the hopes of the Bohemian insurgents, and Ferdinand ordered a sweeping confiscation of their estates and a sale by auction. Wallenstein, who had carefully husbanded his means, became purchaser to an almost incredible extent. The nominal value of the estates he bought was 7,000,000 florins, but the real value was not less than 20,000,000. In 1623 he received the title of prince of Friedland; his possessions comprised nine towns and 57 villages and manors in Bohemia, toward the Silesian frontier. In 1627 he was made hereditary duke of Friedland, with almost sovereign rights; he also acquired Sagan in Silesia. In 1625 the force of the Catholic reaction was spent. The Protestant princes of North Germany had formed a powerful coalition with Denmark, and the Turks and Transylvanians under Bethlen Gábor threatened to overrun Austria from the east. The imperial treasury was empty, and the army disorganized. Wallenstein offered to raise and equip an army of 20,000 men, and lead them whithersoever the emperor might direct. The offer was accepted, and he was appointed generalissimo. On April 15 (O. S.), 1626, he drove back the renowned Mansfeld at Dessau with heavy loss, and closely pursued him through Silesia into Hungary. Mansfeld died on his way to Venice to obtain subsidies, and the aggressions of Bethlen Gábor were checked by difficulties with his Turkish allies. By a series of manœuvres Wallenstein dispersed the remnant of Mansfeld's troops in Silesia and defeated the Danish troops in Holstein and Schleswig at Heiligenhafen, Pinneberg, Breitenburg, and Wensyssel. The Danish army was completely scattered or captured and the North German coalition broken up. Tilly, the leader of the Catholic league formed by Maximilian of Bavaria, having been disabled by a wound, Wallenstein had the sole direction of affairs. His troops overran lower Saxony, Mecklenburg, and Jutland, and besieged Stralsund; but he was compelled to raise the siege on Aug. 3, 1628. His army, numbering over 100,000 disciplined troops, was quartered over North Germany. The dukes of Mecklenburg, who had been allies of Christian IV. of Denmark, were dispossessed, and their lands pronounced forfeited. Wallenstein was invested with the title and dignity of duke of Mecklenburg, at first provisionally, then definitively (1629), with full powers. But his very success led to his temporary downfall. The emperor Ferdinand II., desirous of having his son declared king of the Romans and successor to the throne, in the summer of 1630 convened the electoral conference of Ratisbon. The electors, Catholic as well as Protestant, groaning under Wallenstein's enormous exactions and jealous of his might, and also unwilling to recognize him as prince of the empire in his capacity of duke of Mecklenburg, combined against him. Richelieu, through his agents at Ratisbon, held out hopes of a general peace, and intrigued with the electors. Ferdinand yielded to the coalition and accepted their conditions, the chief of which was the dismissal of Wallenstein. In doing so, he acted against the advice of the Spaniards, who regarded Wallenstein as their strongest ally against the French. Wallenstein retired to his residence at Gitschin, followed by many of his best officers, and lived in princely state, doing much to improve agriculture, manufactures, and education. Tilly, who succeeded him in the command, was utterly routed by Gustavus Adolphus at Breitenfeld, near Leipsic, Sept. 7 (O. S.), 1631. Shortly before the battle Wallenstein endeavored to obtain from Gustavus Adolphus a detachment of 12,000 troops, pledging himself to attack the emperor in Bohemia; but the negotiations fell through. The battle of Breitenfeld spread terror over Austria. The emperor, ignorant of the treasonable negotiations with Gustavus, turned to Wallenstein as his only hope. The general, jealous already of Gustavus's power and perceiving the opportunity of gratifying his own ambition, consented to take command for three months and reorganize the imperial army. Of the terms which he exacted the principal point was the repeal of the edict of restitution. This edict, passed by the emperor in 1629, restored to Catholicism all church property that had been converted to Protestant uses since the peace of Passau, 1552. Wallenstein, who was a man of broad views and hostile to ultramontane influences, though not free from superstition and even addicted to astrology, had opposed the edict as impolitic; and the bitter feeling it aroused in North Germany had a large share in Gustavus's success. By the spring of 1632 a new imperial army was ready for action. Wallenstein then tendered his resignation, pleading ill health, doubtless merely as a feint to obtain greater powers. According to Ranke, the emperor conferred upon him the right of confiscation, amnesty, pardon, and supreme military authority in Germany, and the right to negotiate peace and appoint officers below the rank of general. By the end of May Wallenstein had driven the Saxons out of northern Bohemia, and he then threw himself upon Nuremberg. Gustavus, who had defeated Tilly a second time at the Lech and overrun Bavaria, hastened to the relief. For more than two months the two great generals lay confronting each other in intrenched camps. At last Gustavus made a desperate attempt, Aug. 24, to force Wallenstein's position, but failed. Shortly afterward he withdrew, leaving a strong garrison in the city. Both armies were terribly reduced by pestilence and want of provisions. Gustavus attacked Bavaria once more. Wallenstein, instead of confronting him, marched into electoral Saxony. Gustavus followed in rapid marches. The two armies met at Lützen, not far from Leipsic. Wallenstein recalled Pappenheim, whom he had sent on a predatory expedition. Gustavus's attack was made on the morning of Nov. 6 (O. S.), 1632, before Pappenheim's cavalry reached the field. The battle was the bloodiest and most desperate of the war, and neither side could claim the victory. Gustavus and Pappenheim fell. But Wallenstein's army was crippled, and decamped in the night, leaving its artillery. Wallenstein retired to Prague, where he held a court martial, executed 17 officers for cowardice, degraded others, and rewarded those who had shown ability and courage. He passed the winter and spring in reorganizing his army; but the Swedes were almost as formidable as ever, and the entire summer of 1633 was passed in negotiations. On one occasion only, at Steinau, Silesia, in October, did he assume the aggressive, by capturing a Swedish detachment under Duval and Thurn. Even this was of little avail, for Bernhard of Weimar, suddenly collecting his troops in Franconia, captured Ratisbon, Nov. 5. Wallenstein fell back upon Pilsen, and put his army in winter quarters in northern Bohemia. The court and the Spanish ambassador at Vienna became mistrustful, but the emperor's faith was not yet shaken. Wallenstein seems to have been persuaded that the foe most to be dreaded was Richelieu, and that the peace of which the emperor was sorely in need could not be effected without making France a party, which was contrary to the wishes of the Spaniards. While he was negotiating with the Saxon general Arnim (or Arnheim), Oñate, special envoy at Vienna from Milan, was working upon the emperor to order troops to be sent to the Low Countries. This was contrary to the terms of Wallenstein's command, and he declined to obey. Feeling that his position was becoming insecure, he pushed the negotiations with Saxony to a point where they became, if not exactly treasonable, at least hostile to the supremacy of the emperor. Oñate's demand for troops was made early in January, 1634. Wallenstein submitted it to a council of officers, who denounced it as impracticable, and signed a declaration pledging themselves to stand by the general. There is little doubt that he contemplated joining Arnim and compelling the emperor to accept peace. Kinsky, professing to act as his agent, had submitted to Richelieu a plan for proclaiming Wallenstein king of Bohemia. The general himself seems to have given it scarcely any attention, though Oñate succeeded in convincing the emperor that he was acting in a treasonable manner. With great reluctance Ferdinand consented to his deposition. Gallas was made provisional commander-in-chief, and letters patent were issued releasing all officers from obedience to Wallenstein. The proceedings were conducted with the utmost despatch and with perfect secrecy, and Gallas, Piccolomini, Aldringer, Colloredo, and the other leading officers were won over. On Feb. 19 Wallenstein issued orders to the heads of regiments to assemble at Prague, where he hoped to meet Arnim. But the commander at Prague, who had been secretly instructed by Gallas and Aldringer, published the news of Wallenstein's dismissal, and the garrison remained loyal. Other garrisons did the same. All at once Wallenstein perceived that the army upon which he relied had failed him, and his plans had been thwarted. It was no longer a question of might with him, but of life and death. He set out for Eger, Feb. 22, accompanied by only a few troops and a few firm adherents, Terzky (or Trzka), Ilow (or Illo), Kinsky, and Neumann. On the road he met Butler, colonel of a regiment of dragoons, and ordered him to join the party. Butler, already in communication with Piccolomini, obeyed reluctantly. Wallenstein reached Eger on Feb. 24. That same evening he informed Leslie, one of the officers of the garrison there, of his intention to remain and await the arrival of Bernhard of Weimar. The next morning Gordon, the commanding officer, Leslie, and Butler were invited by Ilow and Terzky to a conference, in which they were formally summoned to take sides with Wallenstein. They were in great perplexity. Leslie and Gordon, Protestants and Scotchmen, felt themselves nevertheless bound by their oath to the emperor; Butler was an Irish Catholic and opposed to Wallenstein. The three held a secret meeting. They could not flee without being derelict to their duty, they could not hope to make Wallenstein a captive; every moment was precious, for Bernhard, who had been informed by Ilow of Wallenstein's flight and extremity, was on the way. In the heat of discussion Leslie uttered the decisive words: "Let us kill the traitors!" The resolve was promptly executed. Ilow, Terzky, Neumann, and Kinsky were invited by Gordon to a banquet that evening in the citadel. During the banquet the doors were thrown open, a company of Butler's Irish dragoons armed with skenes were let in, and in a few moments the guests were massacred. An Irish captain, Devereux, taking a few soldiers with him, proceeded to the house where Wallenstein lodged, and burst into his apartments. Wallenstein, who had undressed for the night, was standing by the window. Devereux exclaimed, "Scoundrel and traitor!" and without a word Wallenstein opened his arms and received the fatal thrust of his halberd.—The conduct of Wallenstein has always been one of the vexed questions of German history. Förster, especially in his "Wallenstein before the Tribunal of the World" (1844), endeavored to establish the general's innocence. Upon the strength of his investigations, Count Waldstein-Wartenburg began a suit for the recovery of the estates which were confiscated at the general's death, but the claim was not sustained. Ranke has treated the question almost exhaustively, and in a spirit of perfect impartiality. Wallenstein left a widow and one daughter, a girl of ten years, who married Count Kaunitz.—F. Förster has edited *Wallenstein's Briefe* (3 vols., Berlin, 1828–'9). See also Hurter, *Geschichte Wallensteins* (Schaffhausen, 1855), and *Wallensteins vier letzte Lebensjahre* (Vienna, 1862); Ranke, *Geschichte Wallensteins* (Leipsic, 1869); Hart's edition of Schiller's "Wallenstein" (New York, 1875); and Gindely, *Neues über Wallenstein* (1875–'6).

WALLER, a S. E. county of Texas, formed since the census of 1870; area, about 350 sq. m. It is bounded W. by the Brazos river. The surface is level or slightly undulating, and the soil is productive. It is traversed by the Houston and Texas Central railroad. Capital, Hempstead.

WALLER, Edmund, an English poet, born at Coleshill, Hertfordshire, March 3, 1605, died at Beaconsfield, Buckinghamshire, Oct. 21, 1687. He was educated at Eton and Cambridge, and when only 18 years old was elected to parliament, of which he was a member for most of his life except between 1643 and 1661, holding a seat at the time of his death. In 1630 he married Miss Anna Banks, a London heiress. After the battle of Edgehill (1642) Waller was one of the commissioners who negotiated with the king at Oxford. On the exposure soon after of what is known as Waller's plot, understood to have been a design to seize the government and capture the leaders of the parliamentary party, he made a confession on the strength of which three of his associates were hanged; but he belittled his own share in the plot, begged piteously before parliament for his life, and was let off with a fine of £10,000 and imprisonment for a year. He then went to France, but was permitted to return in 1653. The first edition of his poems appeared in 1645. In 1655 he addressed to Cromwell a poem entitled "A Panegyric to my Lord Protector, of the present Greatness and joint Interest of his Highness and this Nation." This was followed by a poem "On a War with Spain." On the death of Cromwell Waller wrote a poem bewailing that event, which in his works is immediately followed by a congratulatory ode to Charles II. He became a favorite in court and parliament, and was noted for his wit. A new edition of his poems appeared in 1664, and in 1690 a supplementary volume was published.

WALLER, Sir William, an English general, born in 1597, died at Osterley Park, Middlesex, Sept. 19, 1668. He was educated at Oxford and at Paris, was knighted by Charles I., and in 1640 entered parliament. When hostilities broke out, having acquired military experience abroad, he was appointed second in command of the parliamentary forces under the earl of Essex; distinguished himself in the reduction of Portsmouth (1642); subsequently sustained defeats at Lansdown, near Bath, and at Roundway Down, near Devizes (1643); gained a victory at Cherrytown Down, near Winchester, and was again defeated at Cropredy bridge in Oxfordshire (1644). The passage of the self-denying ordinance in April, 1645, deprived him of military command, but in parliament he continued as one of the leaders of the Presbyterians; and he was one of the 11 members of the house who in June, 1647, were impeached of high treason by the army, and expelled. Subsequently he returned, and continued to sit until the Presbyterians were driven out by Col. Pride, Dec. 6, 1648. On Feb. 25, 1660, he was one of the council of state appointed by the house of commons, and he sat in the convention parliament. He wrote "Divine Meditations upon several Occasions, with a Daily Directory" (8vo, London, 1680), and "Vindication of Sir William Waller" (8vo, 1793).

WALLETTE, the N. W. county of Dakota, bordering on British America and Montana, not included in the census of 1870; area, about 3,350 sq. m. It is bounded S. by the Missouri river and drained by several small affluents of that stream. The surface is rolling, and is mostly occupied by the Plateau du Coteau du Missouri.

WALL FLOWER, a perennial cruciferous plant, *cheiranthus cheiri* (from the Arabic name *cheiri*). It is a native of southern Europe, but is naturalized in northern and central Europe. It was introduced into England from Spain over 300 years ago as wall gillofer, which became wall gilliflower and wall flower; it was called wall gillofer from growing in rocky places and on old walls, to distinguish it from the common gillofer, which is now called stock gilliflower. (See GILLIFLOWER.) The flattened pods, the wingless seeds, the much less hoary foliage, and the orange-colored flowers of the wall flower allow it to be readily distinguished from the gilliflower. It grows 1 to 2 ft. high, with lance-shaped entire leaves, and blooms in early spring, its flowers being very fragrant, especially at evening. Cultivation has produced many varieties, both single and double, the color of the flowers varying from yellow to blood-red, and some being handsomely variegated; the choicer kinds are propagated by cuttings, as they do not come true from seeds, which the doubles rarely produce. In the northern states this plant can only be cultivated by preserving it during winter in a cool greenhouse or a pit. The seeds are sown in spring, and the plants will bloom in the following spring. Several other species are cultivated in Europe.

Wall Flower (Cheiranthus cheiri).

WALLIS, Switzerland. See VALAIS.

WALLIS, John, an English mathematician, born at Ashford, Kent, Nov. 23, 1616, died Oct. 28, 1703. He was educated at Cambridge, took holy orders in 1640, and in 1641 became chaplain to Sir William Darley. When the civil war broke out he took the parliamentary side, and deciphered the intercepted letters of the royalists. In 1643 the sequestrated living of St. Gabriel, Fenchurch street, London, was given to him, and in 1644 he was appointed a secretary of the assembly of divines at Westminster, of the proceedings of which he wrote an account. He was among the first who joined the meetings in 1645 which afterward gave rise to the royal society. In 1649 he was appointed Savilian professor of geometry at Oxford. He had a mathematical controversy with Hobbes, carried on by pamphlets from 1655 to 1663. In 1658 he became keeper of the university archives. After the restoration, which he favored, he was named one of the king's chaplains in ordinary. His *Opera Mathematica* were published in 3 vols. (Oxford, 1697-'9); the most important of them is the *Arithmetica Infinitorum*, in which he foreshadowed the binomial theorem and the method of fluxions. He wrote also *Grammatica Linguæ Anglicanæ* (1653), and *Institutio Logicæ* (1687).

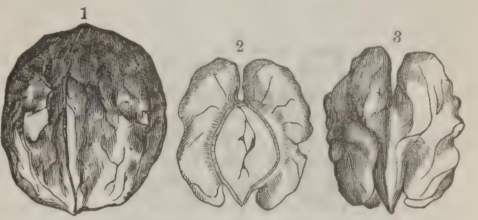
WALLIS, Severn Teackle, an American lawyer, born in Baltimore, Md., Sept. 8, 1816. He graduated at St. Mary's college, Baltimore, in 1832, and was admitted to the bar in 1837. In 1861 he was a member of the legislature, and since 1870 he has been provost of the university of Maryland. His "Discourse on the Life and Character of George Peabody" was delivered in 1870 before the Peabody institute of Baltimore, of which he is a trustee, and before the legislature. He has published "Glimpses of Spain" (New York, 1849), and "Spain, her Institutions and Public Men" (Boston, 1853).

WALLON, Henri Alexandre, a French author, born in Valenciennes, Dec. 23, 1812. He studied at the normal school in Paris, and in 1840 was appointed a professor in the Sorbonne, teaching modern history and geography. His works *De l'esclavage de la colonie* (1847) and *Histoire de l'esclavage dans l'antiquité* (3 vols., 1847–'8) led to his appointment as secretary of Schœlcher's anti-slavery committee, and to his election in Guadeloupe to the constituent assembly, in which however he did not sit. In 1849 he became a member of the legislative assembly for Valenciennes, but withdrew in May, 1850, on account of the restriction of suffrage. He was elected to the new national assembly on Feb. 8, 1871. His amendment (February, 1875) was the first step toward the definitive establishment of the republic, of which he is familiarly called the father. In March, 1875, he became minister of education and of religion. Despite the opposition to his ultramontane views, he was elected by the assembly on Jan. 30, 1876, to the new senate. In the same year he was appointed dean of the faculty of letters. His works include *Les saints Évangiles*, after Bossuet (1855; new ed., 2 vols., 1863); *Jeanne d'Arc* (2 vols., 1860; new ed., 1876), which received the great Gobert prize; *La vie de Jésus et son nouvel historien* (1864), refuting Renan; *Richard II., épisode de la rivalité de la France et de l'Angleterre* (2 vols., 1864); and *La Terreur, étude critique sur l'histoire de la révolution française* (1872).

WALLOONS (Flemish, *Waelen*), a Romance population, over 2,000,000 in number, living in Belgium, chiefly in the region extending between Liége, Mons, and Arlon, and in adjoining parts of France. They are of mixed Gallic and Teutonic blood, the former largely predominating. Their language is an old dialect of the French, although among the upper classes French itself is generally spoken. Of recent attempts to extend the literary use of this patois, the most valuable are those of Auguste Hock, who has published in Walloon French four volumes of miscellaneous writings (Paris, 1872–'5). See also the unfinished work of Grandgagnage, *Dictionnaire étymologique de la langue wallone* (Liége, 1845).—The Walloon church is that branch of the French Reformed church which was expelled from the Catholic Netherlands at the time of the rise of the Dutch republic. Its members settled chiefly in Holland, or emigrated to America, forming several congregations in New Netherland (New York).

WALL PAPER. See PAPER HANGINGS.

WALNUT, the common name of large nut-bearing forest trees of the genus *juglans* (from Lat. *Jovis glans*, the nut of Jupiter), which with the hickories (*carya*) and a few others make up the walnut family (*juglandaceæ*), in which the trees have a colorless juice, a strong-scented bark, compound leaves, the staminate flowers in catkins, the fertile in small clusters of two or more; the fruit a dry drupe, with a single four-lobed seed. In the walnut tree several accessory buds are formed, one above another, the uppermost far above the axil; the pith of the stems is in transverse plates; the odd-pinnate leaves have numerous leaflets; sterile flowers in long, simple, solitary lateral catkins, from the wood of the previous year, each with 12 to 40 stamens; fertile flowers in small clusters on a peduncle at the ends of the branches, each with a four-toothed calyx and four small petals, the ovary with two very short styles, and club-shaped, fringed stigmas; the outer portion of the drupe (epicarp) fleshy and fibrous, not splitting at maturity; the inner portion or nut (endocarp) irregularly furrowed, and in our species very rough, to which the husk clings at maturity. The hickories are often incorrectly called walnuts. (See HICKORY.)—Three species of walnut are indigenous to the United States. The black walnut (*J. nigra*) is found from New England to Florida, but is much less abundant east than west of the Alleghanies, where, especially in the valley of the Mississippi, it is one of the commonest trees; it is a large, quick-growing tree, and when in a forest has a clear trunk 30 to 50 ft. without a branch, but in open ground it branches low, and forms a wide-spreading head. A celebrated specimen stands on the grounds of W. C. Bryant at Roslyn, L. I., the seed of which is known to have been planted in 1713; at 3 ft. from the ground it measures



Nut (1) and Seed (2, 3) of European Walnut.

Staminate and Pistillate Flowers.

25 ft. in circumference. The leaflets are ovate-lanceolate, somewhat heart-shaped or unequal at base, smooth above and minutely downy below; the fruit is spherical, the surface marked by rough dots, greenish yellow when ripe, but soon turning black; the round, slightly flattened nut has a deeply corrugated, hard shell, with an oily kernel, which soon becomes rancid. The wood of the black walnut is hard, fine-grained, and durable, and takes a fine finish. When first cut it is purplish brown, but with age it turns very dark, even almost black. The husks of the fruit are used in dyeing, and an oil may be expressed from the kernels. On account of its rapid growth and the value of its timber, this is largely planted in the treeless portions of the western states; the nuts, gathered into heaps, are covered with straw and earth to keep out rain, and in spring are planted where the trees are to stand. The closely related *J. cinerea* is described under BUTTERNUT. The only remaining species, the rock walnut (*J. rupestris*), is found in western Texas, New Mexico, and Arizona; it is a shrub, or sometimes a tree 30 ft. high, with numerous curved leaflets, and a globose fruit with a thin pulp, enclosing a nut about half an inch in diameter, with a remarkably thick shell, the kernel being only as large as a pea.—The European walnut (*J. regia*), also called in this country English walnut, is a native of Asia, and probably of Greece. It grows abundantly throughout Europe, but in this country it rarely ripens its fruit. It forms a large tree; the leaflets are fewer than in our black walnut, oval, smooth, and with entire margins; the fruit is oval, the husk, unlike that of our species, thin and brittle, and readily breaking away from the smoothish, thin-shelled nut. In Europe, where much attention is given to its cultivation, about a dozen named varieties are known, distinguished by the abundance, size, and shape of the fruit, the thinness of the shell, and quality of the kernel; these are propagated by grafting upon seedling stocks; one dwarf variety, called *præparturiens*, produces fruit in three or four years from seed, a peculiarity that is continued by the seed; the double walnut, the *noyer à bijoux* of the French, is cultivated for its large nuts, the shells of which are converted into boxes to hold a pair of gloves, jewelry, &c. The sap of the tree (like that of our species) contains sugar, and has been used in some countries as a source of that product; it is sometimes concentrated and fermented to make walnut wine. The wood, especially from trees grown upon poor soil, is valued for cabinet work, though inferior in beauty to black walnut. The fruit when partly grown, and still so soft that a pin will pass readily through it, is used for pickling and to make walnut catsup; our butternut makes an excellent substitute. In Europe the nuts are esteemed only when fresh; those which are to be kept are mixed with layers of sand in jars, and buried. In countries where the trees abound, large quantities of the nuts are pressed for their oil; for the finest the nuts are cracked, and the thin woody partitions carefully separated from the kernels, which are ground and pressed; this product is used for food, the same as olive oil.

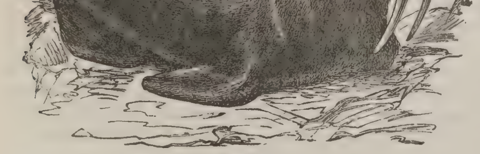
Black Walnut (Juglans nigra)—Tree near Roslyn, Long Island, N. Y.

European Walnut (Juglans regia).

A second pressing, after heating the residue, is used as a painter's oil, which is also obtained by heating the nuts at the first pressing if table oil is not required; the oil is used by artists and for the finer kinds of printers' ink, and is burned in lamps.

WALPOLE. I. Sir Robert, earl of Orford, an English statesman, born at Houghton, in Norfolk, Aug. 26, 1676, died in London, March 18, 1745. He was educated at Cambridge, and on succeeding to his father's estate in 1700 entered parliament. He attached himself to the whigs, aided in promoting the Protestant succession, and in 1705 was appointed one of the council of Prince George of Denmark. In 1708 he was made secretary at war, and assumed the leadership of the whigs in the house of commons. He had the chief management of the proceedings against Dr. Sacheverell, which in private he had strenuously opposed; and upon the overthrow of the whigs in 1710 he retired from office. He was impeached for misappropriation of the public money in his official capacity, and on Jan. 17, 1712, was expelled from the house and committed to the tower. On his release he was immediately returned for Lynn, but was not permitted to take his seat till 1713, when he was elected to the new parliament. On the accession of George I. he entered the cabinet as paymaster general of the forces, and drew up the report of the secret committee to which was referred the impeachment of the late tory ministers. During the rebellion of 1715 he was made prime minister, with the offices of first lord of the treasury and chancellor of the exchequer; but, owing to the intrigues of Sunderland and others, he was induced in April, 1717, with his brother-in-law Townshend, to retire from office. On the day of his resignation he brought forward a scheme for the reduction of the public debt, which may be regarded as the earliest germ of a national sinking fund. In 1720 he reëntered the cabinet as paymaster general of the forces. In the same year the South sea bubble burst, and Walpole, who had strongly opposed it, was called upon to repair the injury inflicted upon the public credit. In April, 1721, he became again first lord of the treasury and chancellor of the exchequer, and was offered a peerage, which he declined; but his eldest son was created Baron Walpole of Walpole. On the accession of George II. he was confirmed in office by the favor of Queen Caroline. In 1733 he introduced a scheme for converting the customs duties upon certain articles of import into duties of excise, and to ameliorate the laws of the excise. The public were induced to believe that a general excise was contemplated, and a storm of popular indignation was aroused, which compelled him to abandon the bill. In 1739 the Spanish war was forced upon the kingdom against Walpole's convictions, whose resignation the king refused to accept. But discord increased in the cabinet, the opposition grew bolder, and on Feb. 11, 1742, after an unparalleled premiership of 21 years, he resigned all his offices, having two days previous been created earl of Orford. The general acquirements of Walpole were not remarkable, and his manners were coarse and boisterous, his conversation, according to Savage, ranging from obscenity to politics and from politics to obscenity; but he was probably the most dexterous party leader that ever sat in the house of commons. The charges of corruption so freely brought against him in his own and in later times have probably been much exaggerated. **II. Horatio,** Baron Walpole of Wolterton, brother of the preceding, born in 1678, died in 1757. During the administration of his brother he filled several important offices and foreign missions. He wrote an "Answer to the Latter Part of Bolingbroke's Letters on the Study of History" (London, 1762). In 1756 he was raised to the peerage. **III. Horace,** an English author, third and youngest son of Sir Robert Walpole, and fourth earl of Orford, born in London, Oct. 5, 1717, died there, March 2, 1797. He was educated at Eton and Cambridge, and after a continental tour in company with the poet Gray, he returned in 1741 to England, and entered parliament, where he held a seat till 1768. He had received from his father several sinecure offices, which yielded him about £4,000 a year; and he busied himself for many years with building and decorating a "little plaything house" at Twickenham, called Strawberry Hill, which grew into an irregular Gothic mansion. Here he collected pictures, prints, books, manuscripts, armor, and relics of antiquity, and printed on a private press, established in 1757, Gray's "Odes," a 4to edition of Lucan, Hentzner's "Travels," and other works, including several by himself. His literary labors began with the publication in 1747 of his *Ædes Walpolianæ*, which was little more than a catalogue of his father's pictures at Houghton. It was succeeded by his "Catalogue of Royal and Noble Authors" (1758), in which a dull subject is enlivened by a sprightly style and a fund of anecdote, and which affords also a curious illustration of the strength of his aristocratic predilections; and by his "Anecdotes of Painting in England" (1761–'71), and "Catalogue of Engravers" (1763), both prepared from materials collected by Vertue the engraver. In 1765 appeared his "Castle of Otranto," published originally as a translation by William Marshall from the Italian of Onuphrio Muralto, which may be regarded as the parent of the modern Gothic romance. His remaining publications comprise "Historic Doubts on the Life and Reign of Richard III." (1768), "The Mysterious Mother" (1768), and a variety of minor works. He also projected a 4to edition of his own works, which never proceeded beyond the second volume. His most characteristic writings are his letters. Those addressed to Sir Horace Mann, George Montague, Lord Hertford, and others, were first embodied in a uniform collection in 1840 (6 vols. 8vo), and his "Entire Correspondence" was published under the supervision of Peter Cunningham (9 vols. 8vo, 1857–'9; new ed., 1861). In addition to these he prepared "Memoirs" of the last 10 years of the reign of George II. (edited by Lord Holland, 2 vols. 4to, 1828), of the first 12 years of the reign of George III. (edited by Sir Denis Le Marchant, 4 vols. 8vo, 1844–'5), and of the reign of George III. from 1771 to 1783 (edited by Dr. Doran, 2 vols. 8vo, 1859). A compilation of Sir Horace Mann's letters to him, under the title of "'Mann' and Manners at the Court of Florence, 1740–1786," edited by Dr. Doran, was published in London in 1875 (2 vols. 8vo). At the age of 74 he succeeded his nephew as fourth earl of Orford, which title, as he was never married, expired with him. It was revived in 1806 in favor of his cousin, Horatio, second Baron Walpole of Wolterton.

WALPURGIS NIGHT (Ger. *Walpurgisnacht*), in Germany, the night before the first of May, or the vigil of St. Walpurgis (spelled also Walpurga or Walburga), a sister of Sts. Willibald and Wunnibald, missionaries from England to the Germans, who died in 776 or 778. The day of her canonization, being the first of May, was celebrated at first as one of general rejoicing; but with the growth of the belief in evil spirits and witchcraft arose the superstition that on the Walpurgis night, which was also the vigil of St. Philip and St. James, the witches and wizards held their annual convocations, the most numerous and important being that on the Brocken, in the Hartz mountains; and it was an old custom, still preserved in some places, to burn straw on this anniversary for the purpose of counteracting the malign influence of these gatherings.



Walrus.

WALRUS, Morse, or **Sea Horse** (*trichechus rosmarus*, Linn.), a marine arctic mammal, resembling the large seals in external appearance, but having dental affinities with the ungulates. The skull is not very large, though heavy, and its processes for muscular insertion are very well marked; the facial portion is more elongated than in the seals, and the anterior part of the upper jaw greatly developed for the canine teeth, between which the lower jaw shuts. In the young animal there are six incisors in each jaw, all falling out during growth except two in the upper; the upper canines hang down as pointed tusks between the small canines of the lower jaw, and project a considerable distance below the chin; their points are sometimes bent toward each other, but are usually turned outward; the molars are originally $\frac{5}{4}-\frac{5}{4}$, but fall out as age advances; they are conical, with simple blunt crowns, worn obliquely at the apex. The head is well proportioned to the body, rounded and obtuse; eyes small and bright; no external ears, and auditory openings far back; nostrils large, on the upper part of the snout, and capable of being accurately closed; muzzle very wide and tumid, and the lips remarkably thick and covered with large translucent bristles looking like quills of straw; the front view of the young animal, before the tusks have grown, has a very human aspect. The neck is short and the body bulky, broadest at the chest, and diminishing to the very short tail; the limbs are short and less fin-like than in the seals, the inside of the paws protected by a rough horny covering against violent contact with ice and rocks; the fore paws are a kind of webbed hand, capable of wide expansion and 2 to 3 ft. long; the hind limbs extend straight backward, but are not united; all the fingers and toes have a small nail; there are four ventral mammæ. The skin is between 1 and 2 in. thick, with a covering of close brown hair, and under it is a thin coating of fat, enabling them to withstand the cold of the arctic regions. They attain a length of 12 to 15 and sometimes 20 ft., a circumference of 8 to 10 ft., and a weight of nearly a ton; the color is blackish in the young, brownish in the adults, and more and more whitish with age. They swim very rapidly, but are awkward on land, where they go to rest and to bring forth and suckle their young; they are monogamous, and gregarious both in the water and on land; peaceful, and not afraid of man unless when hunted, but bravely defending their young and their wounded companions; when persecuted they become very wary, and when asleep on the ice floes or the land always set guards; they will carry off their wounded or helpless young with their fore paws. They often have combats with the polar bear on the ice, and with the narwhal and carnivorous fishes in the water. They lie huddled together like swine in their resting places, making loud roarings if disturbed; they may be domesticated like the seals, if taken young, though they are far less docile. The tusks, which weigh 4 to 6 lbs. each, are used as weapons, for climbing on ice and advancing on land, and for tearing up sea weeds. For accounts of their habits see J. Lamont's "Seasons with the Sea Horses" (8vo, London, 1860), and "Yachting in the Arctic Seas" (1876). The food consists almost entirely of the bivalve shells attached to the sea weeds which it tears from the rocks, but occasionally of fish. It is distributed in the arctic regions of both hemispheres, often confined to limited districts far removed from each other; one of their favorite resorts is the sea about Kamtchatka and 10 to 15 degrees on each side on the American and Asiatic shores; another larger one extends from the mouth of the Yenisei, on the N. coast of Siberia, westward to Baffin bay and Prince Regent inlet; its range extends as far as lat. 80° N., and formerly descended in the spring to the Magdalen islands in the gulf of St. Lawrence, in lat. 47°; it occasionally wanders to the coasts of Iceland, and it is especially abundant about Spitzbergen and Nova Zembla. The capture of the walrus is more dangerous and less remunerative than that of the seal, and is pursued both by land and sea. It is hunted for the tusks, oil, skin, and flesh. The tusks afford a very white and hard ivory. It does not yield more than 25 to 30 gallons of oil; but, if extracted before putrefaction has commenced, it is transparent, free from odor, and not unpleasant to the taste, and is then more valued than that of the whale. The skin makes a porous leather more than an inch thick. The flesh is eaten by the Esquimaux and by arctic voyagers.

WALSALL, a municipal and parliamentary borough of Staffordshire, England, 7 m. N. W. of Birmingham, and 110 m. N. W. of London; pop. in 1871, 46,447. It is built on a ridge above a stream of the same name, which joins the Tame below the town. It communicates with all parts by the London and Northwestern and the South Staffordshire railways. There are several fine churches, a public library, and one semi-weekly and two weekly newspapers. Saddlery and hardware of all kinds are the principal manufactures, and in the vicinity are extensive lime kilns, iron mines, and coal pits. Walsall is a place of considerable antiquity, but most of the present town is modern.

WALSH, Robert, an American author, born in Baltimore in 1784, died in Paris, Feb. 7, 1859. He was educated at the Roman Catholic colleges of Baltimore and Georgetown, and relinquished the practice of law in Philadelphia to devote himself to literature. About 1836 he went to reside in Paris, where from 1845 to 1851 he was United States consul. He published "A Letter on the Genius and Disposition of the French Government," after a visit to Europe (1810); "The American Review of History and Politics" (quarterly, 1811-'12); "Correspondence respecting Russia," with Robert Goodloe Harper (1813); "Essay on the Future State of Europe" (1813); "An Appeal from the Judgments of Great Britain respecting the United States" (1819); and "Didactics, Social, Literary, and Political" (2 vols., 1836). He edited the "American Register" for 1817-'18, the "National Gazette" newspaper in Philadelphia in 1820-'36, and the "American Review" in 1827-'36.

WALSINGHAM, Sir Francis, an English statesman, born at Chiselhurst, Kent, about 1536, died near London, April 6, 1590. He was educated at Cambridge, and after the accession of Elizabeth was twice sent on missions to France. In 1573 he was made one of the principal secretaries of state and privy councillor, and knighted, and thenceforth was mainly occupied with the conduct of foreign affairs, in which he exhibited remarkable astuteness. He was ambassador to the Netherlands in 1578, to France in 1581, and to Scotland in 1583. In 1586 he took the chief part in the detection of Babington's conspiracy, and was one of the commissioners for the trial of Mary Stuart, after which the chancellorship of the duchy of Lancaster was added to his other offices. He is said to have delayed for a year by his intrigues the sailing of the Spanish armada. He died very poor. His only child, a daughter, married in succession Sir Philip Sidney, the earl of Essex, and the earl of Clanricarde. His state papers and letters were edited and published by Sir Dudley Digges, under the title of "The Compleat Ambassador" (London, 1655).

WALTER. I. John, founder of the London "Times," born in 1739, died in Teddington, Middlesex, Nov. 16, 1812. He was by trade a printer, and about 1780 became possessed of two patents issued to one Henry Johnson for an invention called logography, which consisted in printing with types representing entire words or their roots and terminations, instead of single letters. On Jan. 18, 1785, he published the first number of a newspaper entitled "The London Daily Universal Register, printed logographically." The logographic system proved a failure, but the paper prospered, and on Jan. 1, 1788, was issued under the title of "The Times, or Daily Universal Register." **II. John,** son of the preceding, born in London in 1784, died there, July 28, 1847. At the age of 19 he became manager of the "Times," which then circulated about 1,000 copies, and succeeded in increasing the circulation within 10 years to 5,000. He interested himself in the improvement of the printing press, and the number of the "Times" for Nov. 29, 1814, was announced as the first sheet ever printed by steam, being executed on König's press. (See PRINTING, vol. xiii., p. 853.) Mr. Walter was elected to parliament for Berkshire in 1832, was reëlected in 1835, and resigned in 1837. In 1841 he was elected for Nottingham. **III. John,** son of the preceding, born in London, Oct. 8, 1818. He was educated at Eton and Oxford, and since his father's death has conducted the "Times." He was called to the bar in 1847, and represented Nottingham in parliament from 1847 to 1859, when he was elected for Berkshire. He was defeated in 1865, but reëlected in 1868 and 1874.

WALTER, Thomas Ustick, an American architect, born in Philadelphia, Sept. 4, 1804. He studied architecture with William Strickland, and began the practice of his art in 1830. In 1831 he designed the Philadelphia county prison. His designs for the Girard college were adopted by the city council in 1833, and the buildings, which occupied 14 years in their erection, were constructed throughout under his direction. In 1851 his plans for the extension of the United States capitol were adopted, and he was appointed architect of that work. He held the office 14 years, during which, in addition to the capitol extension, he designed and executed the iron dome of the capitol, the congressional library, the east and west wings of the patent office, and the extension of the general post office. He also designed the new treasury building and the government hospital for the insane. He was professor of architecture in the Franklin institute of Pennsylvania.

WALTHAM, a town of Middlesex co., Massachusetts, on the Charles river and the Fitchburg railroad, 10 m. W. by N. of Boston; pop. in 1850, 4,464; in 1860, 6,397; in 1870, 9,065; in 1875, 9,945. The most populous portion of the town is built principally on one street more than a mile long, and contains numerous fine residences. It is lighted with gas, and has water works recently erected and a good fire department. Waltham is extensively engaged in manufacturing. The chief establishments are the cotton cloth and hosiery factory and bleaching and dye works of the Boston manufacturing company, and the works of the American watch company, the most extensive in the world, and the first established (1854) for making watches by machinery. Hollow ware, machinery, paper, cabinet ware, and boots and shoes are also produced. There are a national bank with a capital of $150,000, and a savings bank with $1,150,000 deposits. The assessed value of property is more than $10,000,000. The town contains a high school, two grammar schools, about 25 of lower grades, and a Swedenborgian theological school. The free public library contains nearly 8,000 volumes. Two weekly newspapers are published. There are eight churches: Baptist, Congregational, Episcopal, Methodist, Roman Catholic, Swedenborgian, Unitarian, and Universalist. Waltham was separated from Watertown and incorporated in 1738.

WALTHER VON DER VOGELWEIDE ("Walter of the bird meadow"), a German minnesinger, born in Franconia or Austria between 1165 and 1170, died in Würzburg about 1228. He was of a noble but not wealthy family, and learned the art of poetry under Reinmar. He found his first patron at Vienna in Duke Frederick, and about 1187 began to compose poems. After the death of the duke in 1198, he led for many years a wandering life, attaching himself to a number of princes in succession. Toward the close of his life he received from the emperor Frederick II. a valuable fief near Würzburg. His early verses were chiefly love songs, but in later years he treated of the crusades and the civil commotions in Germany. Editions of his poems have been published by Lachmann (1827; 4th ed., 1864), Wackernagel and Rieger (1862), and Pfeiffer (1864). Horing has furnished a *Glossarium* to his poems (1844), and his life has been written by Uhland (1822) and Menzel (1865).

WALTON. I. A N. county of Georgia, bounded N. E. by the Appalachee river and drained by the head streams of the Ocmulgee and Oconee rivers; area, 320 sq. m.; pop. in 1870, 11,038, of whom 4,162 were colored. The surface is elevated and undulating, and the soil generally fertile. Iron ore and granite abound, and gold has been found. The county is intersected by the Georgia railroad. The chief productions in 1870 were 46,772 bushels of wheat, 178,553 of Indian corn, 34,022 of oats, 20,365 of sweet potatoes, 81,219 lbs. of butter, 6,160 of wool, and 3,536 bales of cotton. There were 1,288 horses, 2,064 milch cows, 3,627 other cattle, 4,219 sheep, and 9,555 swine. Capital, Monroe. **II.** A N. W. county of Florida, bordering on Alabama, bounded E. by the Choctawhatchee river and S. by Choctawhatchee bay, and intersected by the Yellow Water river; area, 1,480 sq. m.; pop. in 1870, 3,041, of whom 405 were colored. The surface is level, and the soil is fertile in the N. and poor in the S. part. It is partly covered with forests of pine. The chief productions in 1870 were 35,574 bushels of Indian corn, 19,164 of sweet potatoes, 17,150 lbs. of butter, 4,125 of wool, 1,627 of tobacco, and 299 bales of cotton. There were 287 horses, 2,770 milch cows, 7,978 other cattle, 2,537 sheep, and 5,886 swine. Capital, Euchee Anna.

WALTON, Brian, an English prelate, born at Cleveland, Yorkshire, in 1600, died in London, Nov. 29, 1661. He graduated at Cambridge, and before 1639 was prebendary of St. Paul's and chaplain to the king. He was active in ecclesiastical disputes, and in 1642 was summoned before the house of commons and ordered into custody as a delinquent. He took refuge at Oxford, and there formed the plan of his polyglot Bible. Subscriptions to the amount of £9,000 were made by May, 1653, and its publication was completed in 1657 (6 vols. fol., London). (See POLYGLOT.) He defended it against the strictures of John Owen in a reply entitled "The Considerator Considered" (1659). Upon the restoration he was reinstated in his preferments, and was consecrated bishop of Chester, Dec. 2, 1660. He also wrote an *Introductio ad Lectionem Linguarum Orientalium* (London, 1654), and a Latin dissertation on the oriental languages and the various texts of Scripture (Deventer, 1658).

WALTON, George, a signer of the Declaration of Independence, born in Frederick co., Va., about 1740, died in Augusta, Ga., Feb. 2, 1804. He first learned the carpenter's trade, then studied law in Georgia, and began practice in 1774. He was one of four persons who in July of that year signed a call for a public meeting at Savannah to devise measures of resistance to the crown. In February, 1776, he was appointed a delegate to congress, and was elected to it in 1777, 1778, and 1780. He was commissioned a colonel in the militia in December, 1778, was wounded at the taking of Savannah, and remained a prisoner until September, 1779. He was twice governor of Georgia, four times a judge of the superior courts, and in 1795 was chosen United States senator for one year.

WALTON, Izaak, an English author, born in Stafford, Aug. 9, 1593, died in Winchester, Dec. 15, 1683. He was a sempster or haberdasher in London, retired from business in 1644 with a moderate competency, and during the remainder of his life, according to Wood, "lived mostly in the families of eminent clergymen of England, of whom he was much beloved." While pursuing his business in London he became an admirer and intimate friend of Dr. Donne, and published a life of him, with an edition of his sermons (1640). In 1651 he edited a collection of Wotton's remains, under the title of "Reliquiæ Wottonianæ," to which was prefixed a life of Wotton. In 1653 he produced his "Compleat Angler, or the Contemplative Man's Recreation," which, apart from its technical value, presents a pleasing picture of the author's cheerful and devout spirit, his enthusiasm for the art of which he treats, his love of nature, and his poetic instincts. Walton lived to see his book go through five editions, the last of which (1676) was accompanied by a second part, "being instructions how to angle for a trout or grayling in a clear stream," written by his intimate friend and adopted son Charles Cotton. Cotton's treatise is mainly devoted to fly fishing, and has ever since been printed with that of Walton. Of the many editions of the "Complete Angler" since published, the most noticeable are those of Major (8vo, London, 1823; 4th ed., with new plates, 1844), remarkable for its numerous admirable woodcuts and engravings; of Sir Harris Nicolas (2 vols. imp. 8vo, London, 1833–'6, reprinted in 1860), which, besides being profusely illustrated, contains the best life of Walton yet written; and of Edward Jesse and H. G. Bohn (1861), containing, with others, the notes and plates of Major's editions. An American edition (1847) contains an excellent bibliographical preface and other valuable matter by the Rev. Dr. Bethune. A facsimile reprint of the rare first edition was published by Elliot Stock in London in 1876. Walton's remaining works comprise lives of Richard Hooker (1665), George Herbert (1670), and Bishop Robert Sanderson (1678); and in 1683 he edited with an introduction John Chalkhill's "Thealma and Clearchus." He left a son, Izaak, who took orders; but no descendants of his name are now known.

WALWORTH. I. A S. E. county of Wisconsin, bordering on Illinois, and drained by affluents of Pishtaka and Rock rivers; area, 576 sq. m.; pop. in 1870, 25,972; in 1875, 26,259. The surface is level and diversified with prairie and forest, and the soil highly fertile. Geneva lake, 8 m. long, is in the S. part, and there are several smaller lakes. The county is intersected by the Western Union and other railroads. The chief productions in 1870 were 605,093 bushels of wheat, 41,210 of rye, 830,179 of Indian corn, 698,033 of oats, 113,835 of barley, 30,137 of buckwheat, 294,157 of potatoes, 639,516 lbs. of butter, 79,327 of cheese, 443,995 of wool, and 52,596 tons of hay. There were 11,244 horses, 9,743 milch cows, 11,296 other cattle, 97,324 sheep, and 17,784 swine; 4 manufactories of agricultural implements, 20 of carriages and wagons, 2 of iron castings, 1 of paper, 2 of pumps, and 13 flour mills. Capital, Elkhorn. **II.** A central county of Dakota, not included in the census of 1870; area, about 900 sq. m. It is bounded W. by the Missouri and watered by several small streams that empty into that river.

WALWORTH, Reuben Hyde, an American jurist, born in Bozrah, Conn., Oct. 26, 1789, died in Saratoga, N. Y., Nov. 21, 1867. He was admitted to the bar in Troy, N. Y., in 1809, and settled in Plattsburgh, where as adjutant general of the state militia he took part in the operations in September, 1814. He removed to Saratoga, and in 1821–'3 was a member of congress, in 1823 was appointed a circuit judge, and from 1828 till the abolition of the court of chancery in 1848 he was chancellor of the state. His published decisions as chancellor are contained in 11 volumes of Paige's reports and 3 of Barbour's (1830–'49). Most of his opinions delivered in the court for the correction of errors, of which he was a member *ex officio*, were published in Wendell's reports (26 vols.), Hill's (7 vols.), and Denio's (5 vols.). He was author of "Rules and Orders of the New York Court of Chancery" (1829), and "The Hyde Genealogy" (2 vols., 1864).—His son MANSFIELD TRACY, born in Saratoga in 1830, graduated at Union college in 1849, and after practising law in Albany devoted himself to literature, publishing "The Mission of Death" (1853), "Hotspur" (1864), "Stormcliff" (1866), "Warwick" (1869), and other novels. He was shot and instantly killed by his son in the Sturtevant house, New York, June 3, 1873.—The chancellor's eldest son CLARENCE graduated at Union college in 1838, became a member of the Roman Catholic order of Paulists, and is now (1876) a priest in Albany, N. Y. He has published "The Gentle Skeptic" (1863), against Colenso on the Pentateuch.

WAMPUM, the common English name for the shell beads used for ornament and as currency among the northern Algonquin and Iroquois tribes of American Indians. They were made chiefly on Long Island and around New York bay. There were two kinds: wampum or wampumpeag, which was white and was made from the conch or periwinkle; and the suckanhock, black or rather purple, made from the hard-shell clam, and worth twice as much as the white. The shell was broken in pieces, rubbed smooth on a stone till about the thickness of a pipe stem, then cut and pierced with a drill. It was strung or made into belts. As money its use passed to the New England, French, and Dutch settlers, being known in French as *porcelaine* and in Dutch as *zewant.* In the Dutch colony four beads, and at a later date six, passed for a stiver; in New England it varied also, and was fixed in 1640 at six beads for a penny. The strings were called fathoms, and varied from 10*s.* to 5*s.* It was strung and used by the Indians for ear rings, necklaces, bracelets, and belts. It was used in all treaties and on all public occasions, a string or belt being given to bind each article of a treaty, and a treaty belt being delivered as a solemn ratification. On these figures were elaborately worked with the different colored beads, not arbitrary, but according to a recognized system, so as to form a record of the event that could be read.

WANDERING JEW, The, according to the popular legend, a person born of the tribe of Naphtali, seven or eight years before the birth of Christ, who ran away from his father to accompany the three wise men from the east who were guided by a star to the manger at Bethlehem. On his return to Jerusalem, his stories of what he had seen, and of the rich presents which the eastern monarchs conferred on the child, saluting him as king of the Jews, were the cause of the massacre of the innocents. Being a carpenter, he was employed in making the cross destined for the passion of Christ, who passed his workshop on the way to Calvary. The soldiers begged him to allow the Saviour to enter for a few moments' rest, but he contemptuously refused and offered insult. According to another legend, he was a shoemaker, sitting at his bench as the Saviour passed, and refused to permit him to sit for rest. According to both legends, Christ bade him to traverse the earth, without possibility of stopping or resting, until the second coming. In his ceaseless wanderings from that time he has in vain sought death amid the greatest dangers and calamities. The legend first appears in the chronicle of Matthew Paris in the 13th century, where the wandering Jew is called Cartaphilus, and said to have been a servant of Pilate. His name in the later forms of the legend is Ahasuerus. The legend has formed the basis of many poems, tragedies, and romances. The most notable designs illustrating it are those of Gustave Doré (Paris, 1856).—See Grässe, *Die Sage vom ewigen Juden* (Dresden, 1844; enlarged ed., 1861).

WANDEROO. See MACAQUE.

WAPELLO, a S. E. county of Iowa, intersected by the Des Moines river; area, 432 sq. m.; pop. in 1870, 22,346. The surface is undulating and the soil highly fertile. Bituminous coal and limestone are found. It is traversed by the Des Moines Valley, the Burlington and Missouri River, and the St. Louis, Kansas City, and Northern railroads. The chief productions in 1870 were 205,050 bushels of wheat, 14,835 of rye, 1,054,570 of Indian corn, 166,356 of oats, 86,156 of potatoes, 314,300 lbs. of butter, 82,511 of wool, and 20,487 tons of hay. There were 6,826 horses, 5,163 milch cows, 9,254 other cattle, 25,193 sheep, and 27,389 swine; 3 manufactories of agricultural implements, 5 of bricks, 5 of carriages and wagons, 1 of iron castings, 2 pork-packing establishments, 8 flour mills, 7 saw mills, and 3 woollen mills. Capital, Ottumwa.

WAPITI, a name given to the *cervus Canadensis* (Erxl.), a large American deer, the new world representative of the stag of Europe. It is 7 to 7½ ft. in total length, and 4½ to 5 ft. high at the shoulders; the color in summer is reddish brown, with a yellowish white disk on the rump having a black streak on each side; in the male the hair of the throat is elongated, and black tipped with red; in winter the color is more grayish; the ears, middle of nape, and front of legs blackish. The tail is very short, the muzzle broad, and the suborbital openings large; hoofs short, wide, and rounded; ears shorter in proportion than in the Virginia deer, narrow, sharp-pointed, and hairy on both surfaces. The horns are much larger than those of the stag, round, erect, branching, ending in a fork, measuring 4 or 5 ft. in their widest spread, and weighing from 20 to 30 lbs.; they are thickly covered with warty elevations arranged in longitudinal lines, with smooth, sharp, and whitish points, the general color being walnut brown; all the snags spring from the anterior surface. They live in families of six or seven, in clumps of wood, feeding on grasses, young shoots of the willow and poplar, the fruit of the wild rose, &c.; they are usually shy, and make a harsh braying noise; the flesh is rather coarse. They are found from the Atlantic to the Pacific, in the northern states and in Canada, not going further N. than lat. 57°; they are most abundant on the upper Missouri and Yellowstone rivers, and have occasionally been found in the Alleghanies. The wapiti is hunt-

Wapiti (Cervus Canadensis).

ed by the Indians for the skin, which retains its flexibility after having been wet. It is generally called here elk, a name properly belonging to the moose; it is also named red deer, stag, gray moose, and gray elk. It has been trained to go in harness.

WAPPERS, Gustave, a Flemish painter, born in Antwerp in 1803, died in Paris, Dec. 6, 1874. He studied in Antwerp and in Paris, and adopted the style of the romantic school. His "Devotions of the Burgomasters of Leyden" established his reputation in 1830 as an original historical painter. His most celebrated works are "Christ at the Sepulchre," "Charles I. taking Leave of his Children," "Charles IX. on the Night of St. Bartholomew," "Peter the Great at Saardam," "Execution of Anne Boleyn," "Defence of Rhodes by the Knights of St. John," and "The Great Fishery of Antwerp." He was secretary of Leopold I., who made him a baron; and he was director of the academy of Antwerp until about 1855, when he removed to Paris.

WAR. See ARMY, ARTILLERY, BLOCKADE, CAVALRY, FORTIFICATION, INFANTRY, MARTIAL LAW, NAVY, PRIZE, PRIVATEER, SIEGE, &c.

WARBECK, Perkin, a pretender to the throne of England in the reign of Henry VII., born in London, hanged at Tyburn, Nov. 23, 1499. He is said to have been the son of a Jew of Tournay, to which place he went in boyhood. In 1490 he appeared at the court of Margaret, dowager duchess of Burgundy, and there impressed every one with his extraordinary resemblance to Edward IV.; and it has been thought that he was really the illegitimate son of that monarch. At this court he was taught to represent Richard, duke of York, younger brother of Edward V., generally supposed to have been murdered by his uncle Richard in the tower. In 1492, when there was prospect of a war between France and England, the pretender landed at Cork, and was joined by numerous partisans. Charles VIII. invited him to the court of France, acknowledged him as duke of York, and gave him a pension and a body guard. At the peace of Étaples he was dismissed from France and went to Flanders, where the duchess of Burgundy received him as her nephew. The populace of England believed in him, and some of the nobility openly declared for him. Henry VII. learned his true history and published it, putting to death or otherwise punishing many of the domestic conspirators. Warbeck, twice driven from English territory, which with 600 men he had invaded in 1495, went to Scotland, where he was acknowledged by James IV. and received in marriage Lady Catharine Gordon, daughter of the earl of Huntly. Going soon after to Bodmin, Cornwall, he was joined by 3,000 of the inhabitants and began the siege of Exeter, taking on himself for the first time the title of Richard IV., king of England, Sept. 7, 1497. But he was forced to retire to Taunton, though at the head of 7,000 men, and took refuge in the sanctuary of Beaulieu in the New forest. He was taken prisoner, and on the promise of pardon made a confession of his life and adventures; but being kept in custody, he broke from it and fled to the sanctuary of Sheene. He was retaken, put in the stocks at Westminster and Cheapside, forced to read aloud his previous confession, and then confined in the tower. Being detected in a plot for escaping with the earl of Warwick, then in prison, Warbeck was tried and executed.

WARBLER, the common name of the dentirostral birds of the family *luscinidæ* or *sylvicolidæ*, including many subfamilies and a great number of species. The bill is of moderate length, slender, broad at the base and tapering to the end; wings long, and tarsi long and slender; they are very sprightly, and small; many are exquisite singers, and some have a beautiful plumage. They are spread over all the habitable globe, and perform a very important part in the economy of nature in keeping down the number of minute insects which inhabit flowers, fruit, and foliage. In this family, according to Gray, belong the wagtails (*motacillinæ*), the titmice (*parinæ*), the *erythacinæ* (like the blue bird, and the old world robin, pratincole, and redstart), the *malurinæ* or soft-tailed warblers of the East Indies and Australia, and the *sylvinæ* or *luscininæ*, the typical warblers. The last seek for insects on trees and shrubs, eating also fruits and seeds; the nest is generally cup-shaped and neatly made, the eggs five to eight, and the broods two in a season. This subfamily contains the nightingale, the kinglets, and the old world warblers like the black-capped *sylvia.* (See BLACKCAP.) Of the 40 warblers of North America, placed by Baird in the subfamily *sylvicolinæ*, the names of some of the most common are: the prothonotary, mourning, blue-winged, yellow, golden-winged, orange-crowned, black-throated green, gray and blue (three), yellow-rumped, Blackburnian or hemlock, bay-breasted, pine-creeping, chestnut-sided, blue, black poll, black and yellow, and prairie warbler.

WARBURTON, Eliot Bartholomew George, a British author, born at Aughrim, county Galway, in 1810, lost in the steamer Amazon, burned off Land's End, Jan. 4, 1852. He was educated at Cambridge, and was called to the Irish bar, but devoted himself to the improvement of his estates, and to travel and literature. He wrote "The Crescent and the Cross, or Romance and Realities of Eastern Travel" (1845); "Hochelaga, or England in the New World" (1846); "Memoirs of Prince Rupert and the Cavaliers" (3 vols., 1849); "Reginald Hastings," a romance of the same period (1850); "The Conquest of Canada" (2 vols., 1849); "Memoirs of Horace Walpole and his Contemporaries" (2 vols., 1851); "Darien, or the Merchant Prince" (1852); and "Memoir of Charles Mordaunt, Earl of Peterborough" (3 vols., 1853).

WARBURTON, William, an English author, born in Newark, Nottinghamshire, Dec. 24, 1698, died in Gloucester, June 7, 1779. He was educated for the law, and began business at Newark in 1719; but in 1723 he received deacon's orders, and published anonymously "Miscellaneous Translations, in Prose and Verse, from Roman Poets, Orators, and Historians." In 1726 he was ordained a priest, and was presented to the small vicarage of Gryesly, Nottinghamshire. In the same year he went to London, and formed a friendship with Theobald, and also allied himself with the confederacy against Pope. He published "Critical and Philosophical Inquiry into the Causes of Prodigies and Miracles" (12mo, 1727), issued anonymously and subsequently suppressed, and "The Legal Judicature in Chancery stated" (1727). In 1728 he was presented to the rectory of Brant Broughton in Lincolnshire, worth about £200 a year, where he spent most of his life. In 1736 appeared his "Alliance between Church and State, or the Necessity and Equity of an Established Religion and a Test Law demonstrated from the Essence and End of Civil Society, upon the Fundamental Principles of the Law of Nature and Nations." This was followed in 1737–'8 by the first volume of "The Divine Legation of Moses demonstrated on the Principles of a Religious Deist, from the Omission of the Doctrine of a Future State of Rewards and Punishments in the Jewish Dispensation," soon after which he was appointed chaplain to the prince of Wales. In 1739–'40 he published, in a periodical called "The Works of the Learned," a series of letters under the title of "A Vindication of Pope's Essay on Man," which led to a friendship with Pope. In 1741 he published the second volume of the "Divine Legation of Moses," and in 1742 "A Critical and Philosophical Commentary on Mr. Pope's Essay on Man;" and at this time he advised the poet to make Colley Cibber the hero of the "Dunciad" instead of Theobald, and to add a fourth book. Both were accordingly done, and in 1743 the poem appeared with notes by Warburton. In 1746 he was elected preacher of Lincoln's Inn, and in 1747 published his edition of Shakespeare (8 vols. 8vo). About this time arose his controversy with Middleton, out of which grew his treatise entitled "Julian, or a Discourse concerning the Earthquake and Fiery Eruptions which defeated the Emperor's Attempt to rebuild the Temple at Jerusalem" (1750). The following year he published an edition of Pope's works in 9 vols. 8vo, and in 1753–'4 two volumes of sermons preached at Lincoln's Inn. Upon the publication of Bolingbroke's writings, he wrote a review of his philosophy in four letters to a friend (1754–'5). In 1754 he was made one of the king's chaplains in ordinary, in 1755 prebendary of Durham, in 1757 dean of Bristol, and on Dec. 22, 1759, bishop of Gloucester. Among his remaining works is one against Methodism entitled "The Doctrine of Grace, or the Office and Operations of the Holy Spirit vindicated from the Insults of Infidelity and the Abuses of Fanaticism" (2 vols. 12mo, 1762). His friend Bishop Hurd published an edition of his works (7 vols. 4to, 1788), and in 1794 an account of his life, character, and writings. In 1808 appeared a volume of letters addressed to Hurd under the title of "Letters of Warburton to one of his Friends;" and in 1841 the "Literary Remains of Bishop Warburton," edited by the Rev. Francis Kilvert. A "Life of Bishop Warburton" has been published by the Rev. John Selby Watson (8vo, London, 1863).

WARD, Artemas, an American general, born in Shrewsbury, Mass., Nov. 27, 1727, died there, Oct. 28, 1800. He graduated at Harvard college in 1748, and was successively a representative in the colonial legislature and a member of the council, and was also justice of the court of common pleas in Worcester county. In the French and Indian war he served as lieutenant colonel under Abercrombie, and in 1774 was one of the delegates to the provincial congress. At the breaking out of the revolutionary war he was appointed by congress first major general, June 17, 1775, and was in command of the army which began the siege of Boston. On the election of Washington as commander-in-chief Ward was made second in command, and was assigned to command the right wing on Roxbury heights. In April, 1776, a month after the surrender of Boston, he resigned. He was for 16 years a representative in the Massachusetts legislature, and was a member of congress from 1791 to 1795.

WARD, Artemus. See BROWNE, CHARLES FARRAR.

WARD, Edward Matthew, an English painter, born in London in 1816. In 1834 he entered the royal academy and exhibited his first pictures. In 1836–'9 he studied in Rome, where he gained the silver medal from the academy of St. Luke in 1838. He studied fresco painting in Munich. In 1839 he exhibited "Cimabue and Giotto," and in 1843 contributed to the cartoon competition at Westminster hall a heroic composition entitled "Boadicea." His "Dr. Johnson perusing the Manuscript of the Vicar of Wakefield" (1843) was followed by "Goldsmith as a Wandering Musician" and "La Fleur's Departure from Montreuil" (1844), "Dr. Johnson in Lord Chesterfield's Ante-Room" (1845), "The Fall of Clarendon" (1846), and "The South Sea Bubble" (1847). In 1852 he was commissioned to paint eight pictures for the corridor of the house of commons. Of these he painted in oil "General Monk declaring for a Free Parliament," and "William and Mary receiving the Lords and Commons;" but owing to the darkness of the corridor, they have since been reproduced in fresco. "The Landing of Charles II." and "The Acquittal of the Seven Bishops" have been painted in water glass. Among his other works are "An Interview between Charles II.

and Nell Gwynne" (1848), "The Royal Family of France in the Temple" (1851), "The Last Sleep of Argyll" (1854), "Ante-Room at Whitehall during the Dying Moments of Charles II." (1861), "Charlotte Corday" (1863), "The Night of Rizzio's Murder" (1865), "Leicester and Amy Robsart" (1866), "Juliet and the Friar" (1867), "A Royal Marriage" (1868), "Luther's First Study of the Bible" (1869), "Anne Boleyn on the Tower Stairs" (1871), "The Eve of St. Bartholomew" (1873), and "Lady Teazle's Spinster Days" (1875). He became an academician in 1855.

WARD, Genevieve. See supplement.

WARD, Henry Augustus, an American naturalist, born in Rochester, N. Y., March 9, 1834. He was educated at Williams college and the Lawrence scientific school of Harvard university, and became assistant to Prof. Agassiz in the museum of comparative zoölogy. From 1854 to 1859 he studied in Paris and Freiberg, and travelled through Palestine, Egypt, Nubia, and Arabia, and on the west coast of Africa from Morocco to Guinea, and made a voyage up the river Niger. He has visited the West Indies and Central America, and in the course of gold-mining investigations crossed the continent six times, at different places. From 1861 to 1866 he was professor of natural sciences in the university of Rochester. In 1871 he was naturalist of the expedition sent by the United States government to Santo Domingo. The "Ward cabinets of mineralogy and geology," collected by him, fill 14 rooms in the university of Rochester, and he has made an extensive collection of modern zoölogy. He has established a laboratory for the production of facsimiles of rare fossils.

WARD, James, an English painter, born in London, Oct. 23, 1769, died at Kensington, Nov. 16, 1859. He learned engraving, but devoted himself to painting, and so exactly imitated Morland that his pictures were often sold as Morlands. His most admired work is the "Alderney Bull, Cow, and Calf," in the national gallery. He became an academician in 1811, and painted until after his 80th year.

WARD, John Quincy Adams, an American sculptor, born at Urbana, Ohio, June 29, 1830. He first studied medicine, and then sculpture under H. K. Brown from 1850 to 1856. After two years in Washington, modelling portrait busts, he settled in New York in 1861. In 1864 he completed "The Indian Hunter" in bronze for the Central park, New York, for which he has also made bronze statues entitled "A Private of the Seventh Regiment" and "Shakespeare." He is the author of "The Good Samaritan," commemorating the discovery of anæsthetics, a statue of Commodore Perry, "The Freedman," and many bass reliefs, groups, &c. In 1874 he became president of the national academy of design.

WARD, Nathaniel, an English clergyman, born at Haverhill, Suffolk, about 1570, died at Shenfield, Essex, in 1653. He was the son of a Puritan clergyman, graduated at Emmanuel college, Cambridge, in 1603, practised law, but in 1626 became preacher at St. James's, Duke's place, London, and afterward rector of Standon Massaye in Essex. Adhering to nonconformist principles, he was suspended by Archbishop Laud in 1633. He sailed for New England in April, 1634, and was settled as pastor in Agawam or Ipswich. In February, 1637, he resigned his charge; and in May, 1640, he with several others formed the settlement of Haverhill. In 1645 he returned to England, became pastor of Shenfield, and was a subscriber to the "Essex Testimony." He published, under the pseudonyme of Theodore de la Guard, "The Simple Cobbler of Agawam," a political satire (London, 1647; reprinted, 96 pages, Boston, 1843), and "Mercurius Antimechanicus, or the Simple Cobbler's Boy, with his Lap full of Caveats" (1648), a satire against the London preachers. A memoir of him was published by John Ward Dean (8vo, Albany, 1868).

WARD, Robert Plumer, an English author, born in London, March 19, 1765, died at Okeover hall, Aug. 13, 1846. He was educated at Oxford, and in 1790 was admitted to the bar. In 1805 he was appointed one of the Welsh judges, and soon afterward under secretary of state for foreign affairs, from 1807 to 1811 was a lord of the admiralty, in 1811 became clerk of the ordnance, and in 1823 one of the auditors of the civil list. He wrote a "History of the Law of Nations in Europe from the Time of the Greeks and Romans to the Age of Grotius" (2 vols. 8vo, 1795); "Treatise of the Rights and Duties of Belligerent and Neutral Powers" (1801), with a continuation entitled "Essay on Contraband" (1801); "Tremaine," a novel (1825); "De Vere," a novel (1827); "Illustrations of Human Life" (1837); "Pictures of the World" (1839); "Historical Essay on the Revolution of 1688" (2 vols. 8vo, 1838); and "De Clifford," a novel (1841). His diary has been published under the title "Memoirs of the Political and Literary Life of Robert Plumer Ward, Esq." (2 vols. 8vo, 1850).

WARD. I. Samuel, an American patriot, born in Newport, R. I., May 27, 1725, died in Philadelphia, March 26, 1776. He was a delegate to the convention at Hartford in 1758 to settle the quotas of New England troops in the French war, became chief justice of Rhode Island in 1761, and was colonial governor in 1762–'5 and in 1766. He was one of the founders (1764) of Rhode Island college, afterward Brown university. In 1774–'6, with Stephen Hopkins, he was a delegate to the continental congress at Philadelphia. **II. Samuel,** an American soldier, son of the preceding, born in Westerley, R. I., Nov. 17, 1756, died in New York, Aug. 16, 1832. He graduated at Rhode Island college in 1771, became a captain in the revolutionary army in 1775, and was with Arnold in the attack upon Quebec, where he was taken prisoner, but at the close of 1776 was exchanged. Subsequently as major and lieutenant colonel he served with distinction in several engagements. After the war he was for several years a merchant in New York. In 1814 he was a delegate from Rhode Island to the Hartford convention.—The life of Governor Ward, with a notice of his son, was written by William Gammell in Sparks's "American Biography," 2d series, vol. ix.

WARD, William, an English missionary, born in Derby, Oct. 20, 1769, died in Serampore, Hindostan, March 7, 1823. He learned printing, studied for the ministry, and in 1799 was sent by the Baptist missionary society to India and settled at Serampore, where, with the exception of a visit to England, Holland, and the United States in 1819–'21, he remained till his death. He printed the Bengalee New Testament and other translations, and wrote "An Account of the Writings, Religion, and Manners of the Hindoos" (4 vols. 4to, Serampore, 1811, reprinted in England and the United States), "Farewell Letters to Friends in the United States" (1821), and other works.

WARDLAW, Ralph, a Scottish clergyman, born at Dalkeith, Mid-Lothian, Dec. 22, 1779, died in Glasgow, Dec. 17, 1853. He was educated at the university of Glasgow and the divinity hall of the Secession church in Selkirk. From 1803 till his death he had charge of a congregation of Scottish Independents in Glasgow, and from 1811 he was professor of systematic theology in the Independent theological academy in that city. The completion of the 50th year of his ministry in 1853 was celebrated by a public meeting, in connection with which a large sum of money was collected and expended in erecting the "Wardlaw Jubilee School and Mission House" at Dove Hill, a destitute part of the city. His works include "Discourses on the Socinian Controversy" (1814); "Unitarianism incapable of Vindication" (1816); "Expository Lectures on the Book of Ecclesiastes" (2 vols. 8vo, 1821); and "Lectures on Systematic Theology" (3 vols. 8vo, 1856–'7).—See "Memoir of the Life and Writings of Ralph Wardlaw, D. D.," by W. L. Alexander, D. D. (London, 1856).

WARE, a S. E. county of Georgia, bordering on Florida, intersected by the Satilla river, and also drained by its numerous tributaries; area, about 850 sq. m.; pop. in 1870, 2,286, of whom 452 were colored. The surface is level and in many parts swampy. Okefinokee swamp in the S. part, extending into Florida, is 30 m. long and 17 m. wide. The soil is generally fertile. Oranges and figs are produced in considerable quantities. It is intersected by the Atlantic and Gulf and the Brunswick and Albany railroads. The chief productions in 1870 were 28,474 bushels of Indian corn, 8,535 of oats, 20,993 of sweet potatoes, 2,690 lbs. of butter, 3,713 of wool, 17,438 of rice, and 124 bales of cotton. There were 244 horses, 2,192 milch cows, 5,141 other cattle, 1,845 sheep, and 7,033 swine. Capital, Waresborough.

WARE, Bed of. See BED.

WARE. I. Henry, an American clergyman, born in Sherburne, Mass., April 1, 1764, died in Cambridge, July 12, 1845. He graduated at Harvard college in 1785, and was pastor of the first Congregational church at Hingham from 1787 to 1805, when he was elected Hollis professor of divinity at Harvard college. His election gave rise to the discussions which eventually led to the separation of the Unitarians, to whom he adhered, from the orthodox Congregationalists. He held his chair in the college, and later in the theological school, till 1840, when he resigned on account of the loss of his eyesight. He published "Letters to Trinitarians and Calvinists" (Cambridge, 1820), in reply to Dr. Wood's "Letters to Unitarians;" "Answer to Dr. Wood's Reply" (1822); "Postscript to Answer" (1823); and "An Inquiry into the Foundation, Evidences, and Truths of Religion" (2 vols., Cambridge and London, 1842). **II. Henry,** jr., an American clergyman, eldest son of the preceding, born in Hingham, Mass., April 21, 1794, died in Framingham, Sept. 22, 1843. He graduated at Harvard college in 1812, and for the next two years was assistant teacher in the Phillips academy at Exeter, N. H. He was pastor of the second Congregational church in Boston from 1817 to 1830, and afterward professor of pulpit eloquence and pastoral care in the theological school at Cambridge till July, 1842, when he resigned. He published "Discourses on the Offices and Character of Jesus Christ" (1825); "Sermons on Small Sins" (1827); "On the Formation of the Christian Character" (1831); "The Life of the Saviour" (1832); several essays and poems; and memoirs of Oberlin, Noah Worcester, Joseph Priestley, and others. The Rev. Chandler Robbins made a selection of his writings (4 vols., Boston, 1846–'7), and his brother John published his "Memoir" (2 vols., Boston, 1846), which contains a list of all his writings. **III. John,** an American physician, brother of the preceding, born in Hingham, Mass., Dec. 19, 1795, died in Boston, April 29, 1864. He graduated at Harvard college in 1813, received the degree of M. D. in 1816, and practised in Boston. From 1832 to 1858 he was professor of the theory and practice of medicine in the medical department of Harvard university. He published "Medical Dissertations on the Spitting of Blood and on Suppuration" (1820); "Remarks on the Employment of Females in Midwifery" (1820); "History and Treatment of Delirium Tremens" (1831); "Discourses on Medical Education and on the Medical Profession" (1847); "Contributions to the History, Diagnosis, and Treatment of Croup" (1850); "Hints to Young Men on the True Relations of the Sexes" (1850); and "Success in the Medical Profession" (1851). **IV. William,** an American clergyman, brother of the preceding, born in Hingham, Mass., Aug. 3, 1797, died in Cambridge, Feb. 19, 1852. He graduated at Harvard college in 1816, and at the

Cambridge divinity school in 1819. From 1821 to 1836 he was pastor of the first Congregational church of New York, and in 1837 was called to the second Congregational church in Waltham, Mass. In 1848–'9 he travelled in Europe. For several years he edited the "Christian Examiner," and he wrote vivid representations of ancient life and manners entitled "Letters from Palmyra" (2 vols., New York, 1837; later known under the title "Zenobia"), "Probus" (2 vols., 1838; afterward entitled "Aurelian"), and "Julian, or Scenes in Judea" (2 vols., 1841). He also published "Sketches [afterward Pictures] of European Capitals" (Boston, 1851), and after his death appeared his "Lectures on the Works and Genius of Washington Allston" (1852).

WAREHOUSEMAN, in law, one who receives goods of any kind for the mere purpose of storage. He is a bailee, and, his contract with the owner being one for their mutual benefit, is held only to ordinary care and diligence; and if loss or injury happen to the goods, he is not responsible without the absence of this care or diligence on his part, unless he expressly assumes a greater responsibility. There is nothing, however, to prevent warehousemen from receiving goods on any terms or contract they see fit to make with the owner. Persons may become warehousemen, and subject only to the law of that relation, whose general position is quite different. Forwarding merchants in the United States are generally regarded as warehousemen, unless they take upon themselves the duty and the responsibility of common carriers, which they do when they begin to act in that character. As regards those whose business is that of common carriers, as railroad companies or expressmen, many questions remain to be settled. If they receive goods to be carried at some future time when direction to that effect shall be given by the owner, they are in the mean time to be regarded as warehousemen only; but if they receive them to be sent forward immediately, they are at once under the responsibility of common carriers. On the other hand, if they have transported goods to their place of destination and hold them for delivery when called for, some courts hold that they are now in law only warehousemen, while others hold that their responsibility as carriers continues until the consignee has been notified and has had reasonable time and opportunity to take the goods away. The question has often become of great practical importance where railroad warehouses have been accidentally destroyed. If the carrier is himself to deliver the goods, his responsibility as such continues until delivery. A warehouseman has a lien on goods in his care for their storage, but not for the storage of other goods, or for any general balance of accounts.

WARFIELD, Catharine Anne (Ware), an American authoress, born in Washington, Miss., in 1817. She was educated in Philadelphia, and in 1833 married Elisha Warfield of Lexington, Ky. With her sister, Mrs. Eleanor Lee (who died in 1850), she published "The Wife of Leon, and other Poems" (New York, 1843), and "The Indian Chamber, and other Poems" (1846), under the *nom de plume* of "Two Sisters of the West." Mrs. Warfield has since published "The Household of Bouverie" (2 vols., 1860; new ed., 1875); "Romance of Beauseincourt" (1867); "Romance of the Green Seal" (1867); "Miriam Monfort" (1873); "A Double Wedding" (1875); and "Hester Howard's Temptation" (1875).

WARMING AND VENTILATION. The principles upon which these arts depend are so mutually involved that it is necessary to consider them together. Much information upon the general subject will be found under the heads Atmosphere, Fuel, Heat, Lungs, Oxygen, and Respiration. While the human body requires to be kept at a temperature of 98° in order to sustain the life processes, it loses heat in a colder medium, like any other kind of matter. This heat is economized by clothing, and by the supply of warmth from external sources. Apartments lose their heat at a rate proportional to the excess of their temperature above the outward atmosphere and the imperfection of the barriers to its escape. Much heat is lost through the thin glass windows. Three fourths of the heat which escapes through the glass would be saved by double windows, whether of two sashes or of double panes only half an inch apart in the same sash. Heat is also lost through walls, floors, and ceilings, at a rate proportional to the conducting power of the materials of which they are composed. Much heat is conveyed away by the currents necessary to maintain combustion; much by the leakage of warm air through various fissures and openings; and where ventilation is attended to, there is further loss by the outflowing currents of vitiated air. To renew this constantly disappearing heat is the object of contrivances for warming.—The necessity of ventilation results from the vital importance of having pure air to breathe. But as impure air does not affect the senses so directly as a falling temperature, more precaution is needful to guard against it. Pure air contains on an average about 21 per cent. of oxygen, the vital element of respiration, and about one volume in 2,500 or ·4 per 1,000 of carbonic acid, a narcotic poison. The air is vitiated in breathing by a double process, the withdrawal of oxygen and the exhalation of carbonic acid. Various causes conspire to deteriorate the air in close inhabited apartments. A person robs of all its oxygen nearly 4 cub. ft. of air per hour, and diminishes its natural quantity 5 per cent. in 80 cub. ft. per hour. The quantity of carbonic acid in the expired breath is 100 times greater than in the natural atmosphere. A person by breathing adds 1 per cent. of carbonic acid to 55½ cub. ft. in an hour, or would vitiate to this extent nearly 1 cub. ft. a minute. Open combustion in a room contaminates the air in the same way. A pound of mineral coal requires 120 cub. ft. of air to burn it, although if the combustion is properly conducted the contaminated air is steadily withdrawn. But in illumination the products of combustion are accumulated within the room. A candle (six to the pound) will consume one third of the oxygen from 10 cub. ft. of air per hour; while an oil lamp, with large burner, will change in the same way 70 cub. ft. per hour. A cubic foot of coal gas consumes from 2 to 2½ cub. ft. of oxygen, and produces from 1 to 2 cub. ft. of carbonic acid. Thus every cubic foot of gas burned imparts to the atmosphere 1 cub. ft. of carbonic acid, and charges 100 cub. ft. of it with 1 per cent. of this noxious gas. Besides these sources of impurity, subtile streams of effete organic matter are constantly exhaling into the air from the lungs and skin of every living animal. The current from the ventilator of a crowded room has an insufferably nauseous odor, and if passed through pure water quickly renders it putrescent. Thus, morbid, organic poisons, so subtile and minute as to elude chemical detection, may be engendered in the confined air of over-crowded rooms, and become the germs of fever and pestilence. A frequent cause of deterioration of the air in close apartments is the withdrawal of its moisture by heating. While the other ingredients of the atmosphere are constant, its moisture depends upon temperature. At zero a cubic foot of air will hold ·18 grain of watery vapor; at 32° it will contain 2·35 grs.; at 50°, 4·24; at 100°, 19·12; and as the temperature goes still higher, the capacity for moisture rapidly increases. When air is saturated at a given temperature, it will receive no more moisture unless the heat be increased; while if its temperature falls, a portion of its water is precipitated. (See Dew.) In the open atmosphere, where the air is in contact with the moist earth, evaporation and precipitation take place with the rising and falling temperature, but usually within normal or healthful limits. But if air is heated without the requisite addition of moisture, its constitution is disturbed, and it becomes injurious. Air saturated with moisture at the freezing point, and then heated in a room to 100°, has but one eighth its necessary quantity of moisture, and the deficiency represents its drying or parching influence upon the lungs and skin. From tainted air follows tainted blood. Oxygen, the consumer of effete matter and purifier of the system, is withheld, and, the carbonic acid already in the air offering a barrier to its exhalation from the lungs, the vital current is encumbered with the noxious products of bodily waste. Under these circumstances it is supposed the blood may become a ready prepared soil for the seeds of infection. Atmospheric malaria may be powerless upon a perfectly healthy system, while it would find ready lodgment in a constitution which bad air, by lowering the tone and depressing the vital powers, had predisposed to epidemic disease. Because it requires a given quantity of carbonic acid in the air to produce immediately injurious effects, it does not follow that a much lower proportion does not seriously impair the constitutional energies, and especially the power of resisting disease. Many a case of disease proves fatal on account of an unperceived depression of the sufferer's strength by continued exposure to an atmosphere impure from bodily exhalations. That vitiated air produces intellectual stupor, depression of the feelings, headache, and predisposition to take cold, is proved by very slight observation; and upon few things is enlightened medical experience more unanimous than that it either causes or greatly aggravates the most malignant diseases, such as fevers, inflammations, infantine maladies, cholera, scrofula, and consumption. The first question in practical ventilation relates to the amount of fresh air that requires to be supplied to occupied rooms; and as the air of such rooms cannot be maintained in absolute purity, the problem is, what is the limit of impurity that may be held consistent with the maintenance of health? Authorities are agreed that the amount of carbonic acid in air tainted by respiration may be accepted as a fair index to the proportion of other and accompanying impurities, so that the question is, how much carbonic acid may be tolerated in respirable air? Parkes, Pettenkofer, Angus Smith, and De Chaumont, agree that the permissible amount of carbonic acid in respired air should not be more than double its normal amount, or ·8 per 1,000 volumes. Dr. Parkes maintains that perfect ventilation should keep the proportion down to ·6 per 1,000; but that, while it is impossible to prove that a proportion of even ·8 per 1,000 volumes produces immediately injurious effects, yet when it rises as high as 1 per 1,000, that is, one tenth of one per cent., the accumulative influence is palpably injurious. If the maximum impurity allowed is ·8 per 1,000 volumes, the exhalation of carbonic acid by breathing would require a supply of 1,500 cub. ft. of pure air per hour, or at the rate of 25 cub. ft. per minute for each person. If the carbonic acid generated by illumination is taken into account, the supply of fresh air would of course require to be greater. The rapid exchange of air involves the difficulty of currents, and this depends much upon the cubical space of the apartment. It is important to avoid perceptible draughts; and if the room be small and the ventilation thorough, the currents are liable to be injurious. Thus with our standard supply of 1,500 cub. ft. an hour, if the apartment has a space of 250 cub. ft., its air must be renewed six times in an hour, while if there is a space of 750 cub. ft., it will require renewal but twice in an hour. Prof. Pettenkofer of Munich has shown that the air in a chamber of 424 cub. ft. (8 ft. high, 8 ft.

long, and 6½ ft. wide) can be renewed once in 10 minutes without creating any appreciable air currents. Dr. Parkes maintains that, with natural ventilation, in the English climate, the air can be safely changed only three or four times an hour, which necessitates a larger initial air space. But the chief practical difficulty in the rapid change of air in small rooms arises from the position of the inlets, which have to be so near the person that draughts can scarcely be avoided. Moreover, in rooms of small space with a large supply of fresh air, it is impossible to obtain a uniform diffusion, as direct currents arise between inlets and outlets. Drs. Parkes and De Chaumont maintain that the space for each healthy adult ought to be at least 1,000 cub. ft., while it is often not half or a quarter that amount. In estimating the quantity of air required for effectual ventilation, it is to be remembered that the air immediately around the person is becoming constantly and rapidly vitiated by exhalations from the skin and the lungs, and the movement of diffusion requires to be so constant and active as to carry it away and keep the body surrounded by fresh air. The supply may become a question of expense as well as of health, when lower standards must be accepted.—Those exchanges of air which are spontaneously effected in houses by means of various facilities, but without the artificial application of power, are known as natural ventilation. All inequalities of temperature in the air set it in motion. If the air in a house is warmer than that without, it will escape through windows, doors, cracks, and flues, and the colder outside air will rush in by all chance apertures to maintain the equilibrium. The movements of the external air greatly assist these exchanges. The wind exerts an aspirating action through chimneys and air shafts, creating a partial vacuum in them, which produces up currents. Cowls placed on the tops of chimneys and air flues favor the aspirating power of the wind. Opposite windows afford cross ventilation when opened, if there is much external atmospheric movement. Various outlets and inlets are arranged in the tops of windows, or substituted for the glass panes, or by inserting perforated bricks in the walls near the ceiling, or by valves in chimneys, or passages that can be opened and closed over the doors. Such arrangements are irregular in their effects, and require vigilant attention to make them serviceable.—In artificial arrangements for securing pure air, the agent of warmth becomes the motor of ventilation. The ordinary open fireplace was one of the earliest means adopted to secure both objects. The heat in this case is entirely radiant, being thrown off directly from the burning fuel or reflected from the sides and back of the fireplace. It strikes upon the walls, ceiling, floor, and furniture of the room, which are warmed and gradually impart their heat to the contiguous air, thus producing gentle and equalizing currents. As the fireplace is at the side of the apartment, and as radiant heat decreases rapidly in intensity, the warming is very unequal. Near the fire it is hot, and at a distance cold, while a person can be warmed only on one side at a time. The open fireplace is the most wasteful of all arrangements for warming, as a copious stream of air passes up the chimney which takes no part in combustion, but carries off with it much heat. This loss is six sevenths, seven eighths, or even more of the heat produced, so that scarcely 12 or 14 per cent. of the heat is utilized. The coal grate is more economical for warming than the larger wood fireplace, chiefly because it lessens the current of air which enters the flue. Like the fireplace, it is closed on three sides, and these should be of some slow-conducting substance and not of iron, which carries away the heat so fast as to deaden combustion. The art of burning fuel to the best advantage in open grates is to maintain the whole mass in a state of bright incandescence by preventing all unnecessary abstraction of heat, either by contact of surrounding metal or currents of cold air flowing over the fire. To be burned with economy, that is, to get from fuel the greatest amount of heat possible, it must consume rapidly and with vivid combustion. To insure the greatest heating effect, the air which comes in contact with the fuel should part with the whole of its oxygen. Every particle of air passing through the fire which does not aid combustion obstructs it, first by directly carrying off a portion of the heat, and secondly by cooling the ignited surface so that it attracts the oxygen with less energy. Air entering below a fire rapidly loses its oxygen and becomes contaminated with carbonic acid, both changes unfitting it for carrying on the process actively in the upper region of the fire. If therefore the mass of burning material be too deep, the upper portions burn with least advantage; or if the pieces of coal be large, scarcely any depth of fuel will be sufficient to decompose the whole of the air which arises through the wide spaces. The modifications of fireplace and grate are innumerable. Some have circular fronts to favor radiation, which is liable to expose the fire to so much air as seriously to obstruct the combustion. An iron plate for a fire-back has been employed to warm an adjacent room behind a fireplace, and for the same purpose grates have been hung upon pivots so as to revolve and thus warm two rooms alternately. In one plan the coal is introduced below the fire, working its way from above downward and consuming the smoke. Grates are often set so low that the radiations pass along parallel with the floor, which is not warmed as it would be if the fire were higher and the radiations struck downward. But, though defective and wasteful for heating, the open fireplace secures considerable ventilation. The magnitude of the open space above the fire, though a source of wasted heat, represents the ventilating capacity of the chimney. Gen. Morin says that a common chimney removes in an hour, on an average, an amount of air which equals five times the capacity of the room it is intended to warm, which is "sufficient in rooms of the usual size to secure a ventilation of over 1,000 ft. of cubic air an hour for each person, supposing there be more than one for every 10 sq. ft. of floor room." Yet it is from the air below the level of the mantel, the purest in the apartment, that the fire is supplied, the vitiated air above being only withdrawn as it cools and descends. There is also very imperfect diffusion, as the air that is drawn in under the doors and through minute openings streams along the floor to the fireplace, chilling the feet in its way. The changes which of late have been effected in the construction of the fireplace to save heat, the contracting of its dimensions and the lowering of the chimney piece, have been unfavorable to ventilation. The double fireplace is an admirable arrangement both for heating and ventilation. A fireplace of soapstone or other material is set up within another, leaving a vacant space between them into which cold air is admitted from without, warmed, and thrown into the room through an opening or register above. Fireplaces upon this principle, with hollow backs for warming air to be admitted into the apartment, and with hearths and jambs of iron, were constructed by Cardinal Polignac as early as 1713. The latest improvement of this kind is the fireplace or stove devised by Capt. Douglas Galton of the English army, for use in the barracks. The grates or open stoves, of different sizes, are set in chimney openings to suit the capacities of the rooms. They give the advantage of an open fire with very complete combustion, and the greatest amount of radiant and reflected heat. The smoke flue is an iron tube set in the chimney and surrounded by air space. On the back of the stove broad iron flanges are cast, so as to present the largest possible heating surface, and these project backward into the air chamber. If the fireplace is built in an external wall, there is an inlet for fresh air from without immediately behind it; but if in an inner wall, a channel of perforated bricks or gratings is laid and passes beneath the flooring or behind the skirting. The fresh air from without, heated in this chamber, enters the room by a louvred opening near the ceiling, or by two such openings, one on either side of the chimney breast. The same principle has been applied to kitchen ranges and stoves in halls; and a cheap cottage grate upon this principle has been devised by Penfold, consisting of well burnt fire clay instead of iron.—Dr. Franklin described the early Holland stoves as plain iron boxes with a flue or pipe proceeding from the top, and a small iron door opening into the room. He also mentions the old German stove as an iron box with one side open, which was set outside of the room, the stove itself projecting through the partition. Smoke and fuel in the apartment were thus avoided, but at the expense of ventilation. The Franklin stove, invented in 1745, was a great step in advance of the older forms, and has been thus described: "It was a rectangular box of cast-iron plates, open in front except near the top, with a sliding shutter by which the whole might be closed entirely or in part, either for safety or for increasing the draught. The hearth projected in front, and was cast with double ledges to receive the edges of the upright plates, and also with a number of holes, viz.: one in the front part with a regulating valve for admitting air to the fire from an air flue beneath when the shutter was down; one behind the first upright plate in the back, for discharging the air brought under the hearth from without into a narrow rectangular air box that was as long as the width of the stove, and as high excepting the space for the smoke flue over its top; and lastly three holes near the extreme back edge for the smoke, after it had passed over the air box and descended behind it, to enter the flue leading into the base of the chimney. The air box at its sides was furnished with holes through which the heated air was admitted into the room, and a succession of shelves one above another was provided in this box, reaching not quite across, by which the circulation of the air was extended and it was longer exposed to the heated surfaces before passing out into the room. The back plate of the stove, heated by the descending smoke flue, imparted heat to the air between it and the chimney, the stove standing a little out from the wall. A register of sheet iron was introduced in the descending flue, which could be closed wholly or in part, and check the fire to any desired extent. Thus this stove embodied the principles of the modern air-tight stoves, and the directions Dr. Franklin gave for using it are just as applicable to these." Stoves in the United States are of great diversity of forms, of cast iron, sheet iron, and sometimes of soapstone; while iron stoves, especially for burning coal, are commonly lined with fire brick, which not only increases their durability, but prevents the metal from being overheated. They heat by radiation in all directions from their surfaces; they also heat the air which, rising into the upper part of the room, is diffused by circulation. Where a room is light, with no loss of heat by outflowing air, and the smoke escapes into the chimney at the temperature of the room, the stove becomes the perfection of economy in heating. Air-tight stoves admit the air in small regulated quantities, so as to produce a slow combustion; but this smothered burning is not economical. The desirable points in stoves are self-acting contrivances to regulate the draught, accurate fitting of the parts, enclosure of the fire space with slow conductors, and the bringing of all the heated products of combustion in contact with the largest possible absorbing and radiating metallic surface, so that the iron will give out its warmth at a low temperature. But the ventilation afforded by stoves, unless especially provided for by connected warm-air chambers, is very imperfect; only the small amount of air which is necessary for combustion is removed from the apartment, while they unquestionably exert a more or less deleterious action upon the remaining air when made very hot. Precisely what the effect of red-hot iron is upon air or persons is not yet determined. The statement that it burns the oxygen out of the air is erroneous, as this effect is quite trivial. A stove weighing 84 lbs. and kept exposed to the air at a red heat for 300 days would, if completely burned up, consume the oxygen of but 6 cub. ft. of air per day, and it would require 19 such red-hot stoves to burn the air as fast as one pair of human lungs. But the ordinary air is contaminated by a great variety of organic matters, carbon particles, filaments of cotton and wool, starch grains, vegetable spores, pollen, volatile emanations, germs of vibriones, bacteriæ, and monads, and floating particles of decayed tissues, such as epithelium and pus cells. As Prof. Tyndall has shown, when an electric beam passes through the air it is seen to be loaded with impalpable dirt. Inhabited apartments are charged with this organic dust, and when it comes into contact with hot iron it is decomposed, giving rise probably to the peculiar odor of "burnt air."—The old English cockle stove, introduced by Mr. Strutt toward the close of the last century, warmed houses by the distribution of heated air, and was the progenitor of our hot-air furnaces. It consisted of a cylindrical fire chamber with a dome-shaped head, and was placed in a bed of masonry with a grating and ash pit below. This part, which from its shape was called the cockle, was enclosed at a little distance by a concentric wall of brickwork, the interval forming a hot-air space. Air introduced from without was thrown into this space against the surface of the iron chamber, and, being heated and rarefied, ascended through openings and was conveyed to the rooms required to be warmed. The modern hot-air furnace consists of an iron stove, which may be variously shaped, and which is surrounded either by an iron or a brickwork case, with a hot-air chamber between. It is situated either in the basement, cellar, or subcellar, while air brought from without (or too commonly from the subterranean apartments) is introduced through proper openings, heated, and conveyed by flues to the different apartments through registers at the base or ceiling. It is urged in behalf of hot-air furnaces that they are out of the way and save space; that they are cleanly, and give but little trouble in attendance; that they are economical in first cost and in consumption of fuel; that they warm the whole house or such parts of it as may at any time be desired; and finally, that they afford at any time an abundant supply of warm fresh air for ventilation. On the other hand, it is objected that "furnace heat" is in a high degree unwholesome, the hot parching air being unfit for respiration; that deleterious gases escape through the openings of the joints, and even pass through the red-hot metal and are thrown into the stream of air to be breathed; that sparks of fire are thus often carried through the building with the greatest danger of conflagration. But it must be admitted that the evils of hot-air furnaces are chiefly those of faulty construction and of gross mismanagement, as they have been employed for years in many dwellings with entire satisfaction. Much alarm has been created by the French experiments of Deville, Troost, and Morin (1863–'9), proving that carbonic oxide permeates cast iron when heated to redness. It has been also shown that red-hot wrought iron is penetrable in the same way. But although carbonic oxide is a far more poisonous compound than carbonic acid, the amount of it that can permeate a red-hot plate of iron half an inch thick is so very minute that it is not to be brought into comparison with other causes of air contamination. The difficulty with cast-iron furnaces is the liability to flaws in the metal, by which obscure passages are left for the escape of gases, and the great danger of leakage at the joints. This is obviated by using wrought iron for construction, and where cast iron is employed it should be tested for flaws, and the smallest number of pieces possible should be used. The attempt to do a large amount of heating with small, cheap, lightly constructed furnaces, put up by inexperienced men, which leads to overheating of surfaces and derangement of the structure, is a chief cause of the bad working of hot-air furnaces. They ought to be large and thoroughly made, and placed as near the centre of the house and as low as practicable. The lower the furnace, the greater the possible inclination of the distributing air tubes, and the greater the ascensive force of the air currents. The passages for the entrance of fresh air should be ample, and every precaution should be taken that there are no causes of impurity in the neighborhood of the source of its supply. It has been pointed out how the capacity of air for moisture increases with its temperature. To prevent the parching influence of furnace-heated air, it is necessary to supply the requisite moisture by evaporation in the hot-air chamber. Provisions for this purpose are usually very inadequate. A copper vessel of from 2 to 4 sq. ft. of open water surface should be provided. Ruttan's air warmer seems to combine the better qualities of stoves and furnaces. It consists of one stove enclosed within another, with sufficient space between to admit a large amount of air, which is brought from without, enters below the floor, passes between the two stoves, and is thrown into the room above. Instead of heating a small quantity of air to a high temperature, the principle of this arrangement is to warm moderately a very large amount of it, and depend upon its rapid exchange to keep the apartments at a proper temperature. It is said to secure the cheapness and simplicity of the stove with the ventilating efficiency of more expensive apparatus. —Water has been used as a vehicle for heat, and its employment depends upon two principles. First, when unequally warmed, its equilibrium is disturbed, and it is thrown into movement. If a tube passes into the upper part of a boiler, and, making a circuit, reënters the lower part, heating the water in the boiler gives rise to a circulation through the tube. The hot water flows away above, and, cooling, descends and returns to the boiler below. Second, the capacity of water for heat is so great, that is, it holds so large an amount of it, that it gives out a large quantity as it cools, and is thus an admirable medium for its distribution. When the heat of a cubic foot of water is imparted to air, whatever be the number of degrees through which the water falls, it will raise through the same number of degrees 2,850 cub. ft. of air. There are two modes of warming by hot water. In one the circulation takes place through a system of small tubes distributed through the house, and constructed to fit any form and succession of rooms and passages. The pipes are coiled into heaps in various situations, and impart their heat by direct radiation. This is Perkins's arrangement. It has no boiler, its place being supplied by a portion of the pipe coiled up in the furnace, and is a high-pressure method, the temperature of the water rising to 300° or 350°. The warmth diffused from a coil of pipes in a room is mild and pleasant, but no ventilation is provided for. In the other form of hot-water apparatus, the pipes do not ascend to any considerable height above the boiler; there is but slight pressure, and the heat does not rise above the boiling point. The boiler and masses of pipes are placed in the cellar or basement, and air from without, warmed by passing among the coils of tubing, is distributed to the apartments through flues and registers. As the boiler and tubes contain considerable water, its temperature rises slowly when fire is first applied, and, the quantity of contained heat being large, it cools with equal slowness. Hence the arrangement is well suited to those cases where permanent and unvarying heat is required, as in greenhouses, graperies, &c. Hot-water pipes thus arranged are a source of steady and equable heat.—Steam has long been employed and is increasingly used for heating purposes. It contains a large amount of latent heat, and can be conveyed with facility through pipes to distant points, where, condensing into water, it gives out its heat, and either flows back to the boiler or falls into reservoirs at various points. Irregularities in the fire affect much more sensibly the circulation of steam than that of hot water, and want of attention may lead to condensation, so that when the fire is renewed the steam rushes into the partial vacuum, and meeting the condensed water drives it violently forward with disagreeable noises, and often with a production of leaks. Steam is applied for heating in two ways, either by coils of pipes or combined metallic sheets (radiators) set up in the various apartments, which warm by direct radiation or by systems of pipes over which air is made to pass, and being heated is sent through the building as in the case of furnaces. Steam radiators give a pleasant heat, but are wholly objectionable from lack of the slightest provision for ventilation. It has been estimated that a boiler adapted to an engine of one-horse power is sufficient for heating 50,000 cub. ft. of space; and that if steam from the boiler of a working engine is to be used for warming, the boiler requires to be enlarged at the rate of 1 cub. ft. for every 2,000 cub. ft. of space heated to the temperature of 70° or 80°. The amount of heat lost through windows and walls, and by escaping air, has been variously estimated. Dr. Arnott says that in a winter's day, with the external temperature at 10° below freezing, it requires, to maintain an apartment at 60°, a steam pipe heated to 200°, or about one foot square for every 6 ft. of single glass windows; as much for every 120 ft. of wall, roof, or ceiling, and as much for every 6 cub. ft. of hot air escaping each minute in the way of ventilation. Hence, a room 16 ft. square by 12 ft. high, with two windows, each 7 by 3 ft., with ventilation at the rate of 16 cub. ft. per minute, would require 20 sq. ft. of radiating surface. Steam for heating is used at a very low pressure, and with suitable precautions is quite safe. For heating large establishments this method has come into extensive use, but, like hot water, it is too expensive for ordinary private dwellings.—Ventilation on a large scale is produced by fans driven by steam power. The fan consists of several vanes, or blades, inserted into a shaft and made to revolve with it. By the rotation of the blades, the air is driven by centrifugal influence to the circumference, tending to create a vacuum at the centre. If two sides be added to the vanes, having an opening round the axis, when the fan is thrown into revolution, air will rush in through the openings and out at the circumference continuously. If tubes connect these central openings with an apartment, its air will be exhausted; and if the circumference be suitably connected with a room, the air will be driven into it. The same machine therefore becomes an exhaust fan or a blowing fan according to the mode of its use. Air impelled by a fan may be heated by various expedients for use in cold weather, but this mode of ventilation is independent of warming, and is chiefly valuable in summer in large establishments, as asylums and hospitals, where many persons are gathered. Ventilating chimneys are flues, sometimes made very high and large, in which fires create powerful draughts that are employed to exhaust apartments of vitiated air. An extra ventilating flue may be constructed adjoining the chimney, warmed by it, and opening into the top of the room, and this may have connecting tubes extending to remote apartments for the ventilation of the whole house. But double outlets to the same apartment rarely work satisfactorily, as the chimney is apt to convert the extra flue into a feeder of the fire, while the smoke escaping from the chimney may be drawn down the flue into the room. The efficiency of ventiducts is augmented by surmounting them with ejectors, which increase their exhaustive action when the wind blows. But under ordinary circumstances, or in the absence of other arrangements, the chimney may be used for conveying away foul air, the velocity of the ascending current giving it considerable exhaustive power. If therefore an opening is made in the chimney breast near the ceiling, the foul gases accumulated in the upper part of the room rush in, and are carried upward with the current. Yet if from any cause the draught of the chimney be interrupted, smoke is driven back into the room; an ordinary register, requiring personal attendance, being of little use. To remedy this inconvenience, Dr. Arnott constructed a self-acting suspension valve, which is placed in the aperture, and so mounted that a current of air passing into the chimney opens it, while an opposite current closes it. A simple modification of this valve consists of a square piece of wire gauze set in the opening with a curtain of oiled silk suspended behind. —Gas jets may be made important auxiliaries to ventilation. Inserted in the bottom of air shafts, they establish active currents which withdraw the vitiated air, and may be made especially useful on occasions when apartments are unusually crowded. It has been proved by experiment that 1 cub. ft. of illuminating gas can be utilized so as to cause the discharge of 1,000 cub. ft. of air; and as a common gas burner will consume nearly 3 ft. of gas an hour, it would extract from an apartment 3,000 cub. ft. of contaminated air during that period. By suitable contrivances also the gas lights, which are usually such active causes of deterioration, may not only become self-ventilating and carry off their own impurities, but also aid materially in keeping pure the air of inhabited apartments. Inventors have made successful contrivances for ventilating the burners of chandeliers, but they have hitherto not received the attention they merit. —The point of entrance of fresh air into dwellings is a matter of importance too much neglected. If there be local sources of impurity in the vicinity, or dust, or organic contaminations near the ground, the apertures of ingress should be so placed as to avoid them. It may be well to bring the air from the top of the house. Openings are sometimes made under the eaves leading to channels constructed in the walls which open into the rooms, or furnish air for the warming apparatus. The practical question in ventilation, at what points the fresh air should be introduced into an apartment and the foul air removed from it, is still a matter of controversy. But the points to be secured in regard to openings are, to place them so as to produce the most perfect diffusion of fresh air without sensible draughts, and to have the places of egress as far away from the inlets as possible. Obviously, if there are large openings or registers of escape at the top of the room, and capacious inlets at the bottom, a strong current from the lower to the higher aperture would be established with imperfect diffusion. The best distribution is effected where the inlets and outlets are numerous, giving rise to many and moderate currents. The general requirements of artificial ventilation are, that the heating arrangements adopted in dwellings shall be made subservient to the supply of pure air; that definite and ample provision shall be made for the withdrawal of irrespirable air; that equal provision shall be made for bringing in the pure air from without; and that the renewal of the breathing medium by this exchange shall be in relation to the capacity of the apartment, while the details of the arrangements are conformed to the varying circumstances of dwellings, apartments, and occupancy. In its application to assembly rooms, legislative chambers, churches, hospitals, theatres, &c., the subject of warming and ventilation presents complicated and still unsettled problems of science and practice, which form a regular branch of technological study. —See "A Manual of Practical Hygiene," by Edward A. Parkes, M. D. (4th ed., London, 1873); "A Handbook of Hygiene and Sanitary Science," by George Wilson, M. D. (2d ed., London, 1873); and Gen. Arthur Morin's treatise "On Warming and Ventilation of Occupied Buildings," translated from the French in the Smithsonian reports for 1873-'4.

WARM SPRINGS, or Bath Court House, a post village and the capital of Bath co., Virginia, noted for its thermal springs, 130 m. W. N. W. of Richmond, and 15 m. N. W. of the Chesapeake and Ohio railroad. The county contains numerous medicinal springs, known as Warm, Hot, Healing, and Alum Springs. The Warm Springs, most frequented by invalids, are in a narrow valley between two mountain ridges. The largest spring, 50 ft. in diameter, has a constant temperature of 98° F. The water holds in solution muriate, sulphate, and carbonate of lime, and sulphate of magnesia.

WARNER, Charles Dudley, an American author, born in Plainfield, Mass., Sept. 12, 1829. He graduated at Hamilton college in 1851, was connected with a surveying party on the Missouri frontier, studied law in New York, in 1856 was admitted to the bar in Philadelphia, and practised in Chicago till 1860. He then became assistant editor, and subsequently editor of the Hartford (Conn.) "Press," and in

1867 assistant editor of the Hartford "Courant." He has published "My Summer in a Garden" (Boston, 1871); "Saunterings," an account of travels in Europe (1872); "Back-Log Studies" (1872); with Samuel L. Clemens (Mark Twain), "The Gilded Age," a novel (Hartford, 1873); and "Mummies and Moslems," travels in Egypt (1876).

WARNER, Susan, an American authoress, born in New York in 1818. She is the daughter of Henry W. Warner (died in 1875), author of an "Inquiry into the Moral and Religious Character of the American Government" and "The Liberties of America." She has published "The Wide, Wide World" (1850), under the pseudonyme of Elizabeth Wetherell, which attained great popularity both in America and Europe; "Queechy" (2 vols., 1852); "The Law and the Testimony" (8vo, 1853), in which the texts proving the great doctrines of Christianity are brought together under their appropriate heads; "The Hills of the Shatemuc" (1856), containing descriptions of scenery on the Hudson river; "The Old Helmet" (1863); "Melbourne House" (1864); "Daisy" (1868); "A Story of Small Beginnings" (4 vols., 1872); "The Say and Do Series, Stories on the Lord's Prayer" (1875); and with her sister "Say and Seal" (1860); "Ellen Montgomery's Book Shelf" (1853–'9); "The Word Series" (3 vols., 1868); "Books of Blessing," stories on the beatitudes, and "Wych Hazel" (1876). Some of her works have been translated into French, German, and Swedish.—Her sister, ANNA WARNER, has published, under the pseudonyme of "Amy Lothrop," "Dollars and Cents" (2 vols., 1853); "My Brother's Keeper" (2 vols., 1855); "Stories of Vinegar Hill" (6 vols., 1871); "The Fourth Watch" (1872); and "The Other Shore" (1873).

WARRANTY, a term used in law, in the transfer of real estate, in the sale of chattels, and in contracts of insurance. The learning of real warranties abounds in the old books, and was subtle and technical in an extreme degree; but it never had much force in the United States. For the principles governing warranties in conveyances of lands, see DEED, and for those in insurance, see INSURANCE. In the sale of chattels or personal property there may be a warranty of title in the seller, or a warranty of the character or quality of the thing sold. As to title, the rule is that he who sells as his own property a chattel in his possession, must be regarded as warranting that he owns the chattel and has a right to sell it in that way, although nothing is said about the title. As to the quality, the warranty may be express or implied. An express warranty is construed with some strictness, because the buyer may and should always take care that the warranty gives him just the protection he desires, and must abide any loss arising from any deficiency or ambiguity in the terms used. If there be no express warranty, then the principle of *caveat emptor* (let the buyer beware) comes in. This may indeed be regarded as a law of sale. Undoubtedly it is a rule which works much hardship and covers much fraud, but it is obvious that courts must have a general rule on this subject. The law, dealing with a buyer and a seller, must determine on which of them the risk and responsibility rest. It must therefore adopt the rule of *caveat emptor*, and say that it is the duty of the buyer to take sufficient care for himself, which he may do either by sufficient examination or by demanding an express warranty; or else it must say that the responsibility must rest on the seller, and that whenever the thing sold turns out to be other than the buyer supposed, the seller must make it good. Either of these rules would have some advantages and be open to some objections; and upon the whole, we believe that the commercial experience of England and of this country is decidedly in favor of the rule of *caveat emptor*. At the same time, the courts have applied important limitations and qualifications to the rule, and as now administered it seems to work well.—In the first place, the rule is never applied to fraud, direct or indirect, or of any kind; but while this rule is clear, what shall constitute fraud is not so plain. It is settled that neither buyer nor seller is bound to communicate to the other information possessed exclusively by him, where the means of intelligence are equally accessible to both. The numerous cases on this question are not in harmony; but from them the general rule may be drawn, that any party may by his silence alone permit another to deceive himself, but if he cause or aid the deception by act or word it becomes a fraud on his part. Another rule is, that no mere praise or commendation of an article or invitation to trade binds the seller. The courts have made an exception to this rule in the case of an article the quality and value of which could only be known by an expert, and which the seller as an expert assumes to recommend to one who he knows relies upon his superior knowledge. And if a seller, pending the negotiation for sale, makes a positive affirmation of quality, intending to effect a sale thereby, and in fact causing or materially promoting the sale, such affirmation is a warranty. If falsely made, it is both a warranty and a fraud. It is certain that the word "warrant" need not be used, nor any other word of exactly equivalent meaning. If the fair meaning of all the words used imports an undertaking or agreement of the seller as to the quality of the thing sold, it is a warranty.—There are interesting cases on the question how far a bill of sale effects a warranty by its description of the thing sold, and it is not easy to determine what is precisely settled by them; but the better and perhaps the prevalent rule appears to be, that a written bill of sale, or sale note, is a warranty of all that it distinctly expresses. There is in some courts a disposition to limit this implied warranty to cases where the buyer has no opportunity for examination. Indeed, it seems to be agreed that the rule of *caveat emptor* necessarily implies one exception; for the law would not require him to "beware" who cannot comply with the demand. If then a seller, having certain knowledge exclusively, sells under circumstances indicating not only that the buyer trusted to his representations, but was compelled to trust to them, these representations would have the effect of warranty. There has sometimes been a disposition to hold that "a sound price implies a sound quality," and therefore that all goods fairly bought for a market are warranted by the seller as fit for the market. But this, which is the rule of the Roman civil law, seems now not to be law in any of our states excepting perhaps South Carolina and Louisiana. If an article is sold, however, not for general use or for a market, but for a specific purpose distinctly made known to the seller, he is held to warrant it to be fit for that purpose. But this rule does not apply where a specific article is bought merely in the belief that it will effect a certain purpose.—Where goods are sold by sample, there is, by the prevailing rule, an implied warranty that the goods shall be equal to the sample; but if they are as good as the sample, this is enough, although the sample had a latent defect, unless the seller knew of this defect and purposely concealed it.—No warranty can be implied from circumstances, where there is an express refusal to warrant. But this rule is never permitted to cover actual fraud. Thus ships are frequently sold by auction, "as they are," or "with all faults." This is an exclusion of warranty; but if the seller knows of faults which are not obvious, and does or says anything to conceal them or draw the attention of the buyer away from them (as where a ship had her bottom worm-eaten and her keel broken, and the seller took her from the ways and kept her afloat where the defects could not be seen), it would be held that the sale would be invalidated by the fraud, although there was no warranty. If the contract of sale is in writing, and there be no fraud, evidence is not admissible to show that there was a parol warranty outside of the contract, nor can a written warranty be enlarged or varied by parol. A mere receipted bill of parcels, however, is not looked upon as a contract of sale, and does not exclude parol evidence of a contemporaneous warranty.—Whatever may be the law as to implied warranties, it seems to be agreed that it has no application whatever to the sale or lease of real estate. From the numerous cases on this subject, it seems difficult to draw any other rule, than that in a deed of sale, or a lease of land or of a house or store, there is no warranty other than that or those which the instrument contains; none, for example, that the premises are fit for the purpose of habitation, occupation, or cultivation, or are adapted for the particular purpose for which they are bought or hired.—In practice, the question what is a breach of warranty arises under the sale of horses "warranted sound," more frequently than elsewhere. Any defect impairing the animal for present service, or which in its ordinary and natural progress must do so, is generally deemed unsoundness; but a habit or propensity like crib-biting is not, though it would probably be covered by a warranty against any unsoundness or vice.

WARREN, the name of 14 counties in the United States. **I.** A N. E. county of New York, partly bounded E. by Lake George, intersected and partly bounded S. and W. by the Hudson river, and drained by Schroon river; area, 912 sq. m.; pop. in 1870, 22,592; in 1875, 23,295. The surface is mountainous, and only about one third of the county is susceptible of cultivation. There is an abundance of iron ore, and limestone, marl, and graphite are found. The Adirondack railroad and the Glens Falls branch of the Rensselaer and Saratoga railroad traverse it. The chief productions in 1870 were 5,966 bushels of wheat, 14,365 of rye, 92,322 of Indian corn, 127,261 of oats, 55,142 of buckwheat, 275,701 of potatoes, 533,467 lbs. of butter, 78,653 of wool, 26,245 of cheese, and 34,610 tons of hay. There were 3,158 horses, 5,944 milch cows, 5,551 other cattle, 20,333 sheep, and 2,166 swine; 1 manufactory of boots and shoes, 4 of lime, 1 of paper, 13 tanneries, 2 currying establishments, 1 flour mill, 21 saw mills, and 1 paper mill. Capital, Lake George (town of Caldwell). **II.** A N. W. county of New Jersey, bounded W. by Delaware river, separating it from Pennsylvania, and S. E. by the Musconetcong, and intersected by the Paulinskill and Puquest; area, about 550 sq. m.; pop. in 1870, 34,336. The surface in parts is mountainous. The elevated portions are well adapted to pasturage, and the soil of the valleys is fertile. Iron ore, zinc, manganese, marble, soapstone, and roofing slate are found. It is traversed by the Morris canal and by the New Jersey Central, the Belvidere Delaware, the Morris and Essex, and the Delaware, Lackawanna, and Western railroads. The chief productions in 1870 were 295,802 bushels of wheat, 84,252 of rye, 747,951 of Indian corn, 322,804 of oats, 72,858 of buckwheat, 81,823 of potatoes, 867,831 lbs. of butter, 45,557 of wool, and 26,401 tons of hay. There were 6,020 horses, 9,145 milch cows, 4,322 other cattle, 14,362 sheep, and 12,501 swine; 9 manufactories of agricultural implements, 18 of carriages and wagons, 13 of clothing, 11 of furniture, 2 of pig iron, 3 of forged and rolled iron, 1 of nails and spikes, 9 of iron castings, 12 of lime, 1 of wrapping paper, 36 flour mills, 5 tanneries, 4 currying establishments, and 14 saw mills. Capital, Belvidere. **III.** A N. W. county of Pennsylvania, bordering on New York, intersected by the Alleghany river, and drained by Brokenstraw, Conewango, and other creeks; area, 832 sq. m.; pop. in 1870, 23,897. The surface is hilly, and the soil generally fertile. There are large forests of excellent timber. Iron ore is found. This county forms part of the great oil region of Pennsylvania. It is intersected by the Philadelphia and Erie, the Atlantic and Great Western, the Oil Creek and Alleghany River, and the Dunkirk, Alleghany Valley, and Pittsburgh railroads. The chief productions in 1870 were 26,759 bushels of wheat, 13,749 of rye, 98,850 of Indian corn, 253,380 of oats, 25,763 of buckwheat, 128,078 of potatoes, 759,853 lbs. of butter, 50,806 of wool, and 39,583 tons of hay. There were 3,599 horses, 7,422 milch cows, 6,352 other cattle, 15,337 sheep, and 3,387 swine; 2 manufactories of machinery, 9 flour mills, 4 planing mills, 105 saw mills, 10 tanneries, 3 iron founderies, and 4 coal-oil refineries. Capital, Warren. **IV.** A N. county of Virginia, intersected by the Shenandoah river; area, 200 sq. m.; pop. in 1870, 5,716, of whom 1,105 were colored. The Blue Ridge extends along its S. E. border. The surface is hilly and the soil fertile. Iron ore, copper, manganese, and limestone are found. It has railroad communication with Washington. The chief productions in 1870 were 100,197 bushels of wheat, 15,317 of rye, 122,700 of Indian corn, 27,252 of oats, 59,144 lbs. of butter, 1,117 of tobacco, 16,072 of wool, and 2,047 tons of hay. There were 1,526 horses, 1,268 milch cows, 7,538 other cattle, 5,185 sheep, and 3,745 swine; 1 manufactory of lime, 1 leather-currying establishment, 8 flour mills, and 2 saw mills. Capital, Front Royal. **V.** A N. county of North Carolina, bordering on Virginia, bounded N. W. by the Warren river, and intersected in the northeast by the Roanoke river; area, 391 sq. m.; pop. in 1870, 17,768, of whom 12,992 were colored. The surface is elevated and undulating, and the soil fertile. There are several valuable mineral springs. The county is intersected by the Raleigh and Gaston railroad. The chief productions in 1870 were 47,484 bushels of wheat, 256,803 of Indian corn, 49,509 of oats, 23,941 of sweet and 9,409 of Irish potatoes, 51,403 lbs. of butter, 6,774 of wool, 751,045 of tobacco, and 1,818 bales of cotton. There were 1,426 horses, 2,677 milch cows, 5,164 other cattle, 3,409 sheep, and 15,734 swine; 18 flour mills, and 7 saw mills. Capital, Warrenton. **VI.** An E. county of Georgia, bounded S. W. by the Ogeechee river; area, 450 sq. m.; pop. in 1870, 10,545, of whom 6,260 were colored. The surface is undulating and the soil fertile. Granite and soapstone abound. It is intersected by the Georgia and the Macon and Augusta railroads. The chief productions in 1870 were 15,037 bushels of wheat, 117,518 of Indian corn, 12,549 of oats, 32,415 of sweet potatoes, 27,203 lbs. of butter, 4,787 of wool, and 7,605 bales of cotton. There were 963 horses, 1,479 milch cows, 3,269 other cattle, 2,269 sheep, and 7,749 swine; 1 cotton mill, and 3 saw mills. Capital, Warrenton. **VII.** A W. county of Mississippi, separated from Louisiana by the Mississippi river, bounded S. E. by Big Black river, and intersected by Steel's bayou and the Yazoo; area, 575 sq. m.; pop. in 1870, 26,769, of whom 18,862 were colored. The surface is hilly in the E. part and low and level along the Mississippi, and the soil fertile. All the rivers which border on or intersect the county are navigable by steamboats, and the Vicksburg and Meridian railroad passes through it. The chief productions in 1870 were 213,073 bushels of Indian corn, 66,227 of sweet potatoes, and 32,175 bales of cotton. There were 1,872 horses, 2,839 mules and asses, 1,963 milch cows, 2,664 other cattle, 1,023 sheep, and 5,576 swine; 1 manufactory of railroad cars, 2 of machinery, 3 of iron castings, 3 of cotton-seed oil, and 2 saw mills. Capital, Vicksburg. **VIII.** A central county of Tennessee, bounded N. E. by the Caney fork of Cumberland river, and drained by the Collins river and its affluents; area, 440 sq. m.; pop. in 1870, 12,714, of whom 1,955 were colored. The surface is mountainous in the E. and hilly in the W. part, and the soil tolerably fertile. The McMinnville and Manchester railroad connects the county seat with the Nashville and Chattanooga railroad. The chief productions in 1870 were 73,391 bushels of wheat, 339,250 of Indian corn, 56,348 of oats, 16,918 of Irish and 17,152 of sweet potatoes, 134,499 lbs. of butter, 27,446 of tobacco, 105 bales of cotton, and 735 tons of hay. There were 3,218 horses, 2,781 milch cows, 4,564 other cattle, 12,495 sheep, and 18,814 swine; 3 flour mills, 2 cotton mills, 4 saw mills, and 6 tanneries. Capital, McMinnville. **IX.** A S. W. county of Kentucky, bounded N. by Green river and intersected by Big Barren river; area, 455 sq. m.; pop. in 1870, 21,742, of whom 6,369 were colored. The surface is moderately hilly and the soil fertile. The county has several extensive caverns and monumental mounds. It is intersected by the Louisville and Nashville railroad. The chief productions in 1870 were 190,904 bushels of wheat, 978,247 of Indian corn, 185,509 of oats, 19,964 of Irish and 21,452 of sweet potatoes, 53,183 lbs. of butter, 39,669 of wool, 2,035,159 of tobacco, and 2,154 tons of hay. There were 5,901 horses, 2,449 mules and asses, 3,965 milch cows, 7,284 other cattle, 16,344 sheep, and 39,722 swine; 12 manufactories of carriages and wagons, 2 of marble and stone work, 2 tanneries, 2 currying establishments, 2 flour mills, 1 planing mill, 5 saw mills, and 1 woollen mill. Capital, Bowling Green. **X.** A S. W. county of Ohio, intersected by the Miami and Little Miami rivers; area, 400 sq. m.; pop. in 1870, 26,689. The surface is undulating and the soil highly fertile. It contains several ancient mounds and has an abundance of limestone. It is traversed by several railroads terminating at Cincinnati and by the Miami canal. The chief productions in 1870 were 427,674 bushels of wheat, 1,487,121 of Indian corn, 281,210 of oats, 157,273 of barley, 130,661 of potatoes, 574,554 lbs. of butter, 474,623 of wool, and 14,485 tons of hay. There were 7,801 horses, 6,487 milch cows, 7,491 other cattle, 19,710 sheep, and 32,836 swine; 9 manufactories of carriages and wagons, 2 of malt, 5 saw mills, and 9 flour mills. Capital, Lebanon. **XI.** A W. county of Indiana, bordering on Illinois and bounded S. E. by the Wabash river; area, 360 sq. m.; pop. in 1870, 10,204. About half of the county is occupied by Grand prairie, the rest is undulating, and the soil is very fertile. The Wabash and Erie canal, and the Toledo, Wabash, and Western railroad pass through it. The chief productions in 1870 were 142,342 bushels of wheat, 442,874 of Indian corn, 122,153 of oats, 27,093 of potatoes, 107,505 lbs. of butter, 46,653 of wool, and 16,195 tons of hay. There were 4,126 horses, 2,557 milch cows, 10,093 other cattle, 13,006 sheep, and 14,746 swine. Capital, Williamsport. **XII.** A W. county of Illinois, drained by Henderson river and several smaller streams; area, 540 sq. m.; pop. in 1870, 23,174. The surface is level and the soil highly fertile. Bituminous coal and limestone abound. It is intersected by the Chicago, Burlington, and Quincy, and the Rockford, Rock Island, and St. Louis railroads. The chief productions in 1870 were 192,002 bushels of wheat, 72,212 of rye, 2,982,853 of Indian corn, 601,054 of oats, 85,152 of potatoes, 420,268 lbs. of butter, 52,718 of wool, and 36,037 tons of hay. There were 14,230 horses, 1,215 mules and asses, 8,358 milch cows, 16,679 other cattle, 12,735 sheep, and 52,191 swine; 3 manufactories of agricultural implements, 15 of carriages and wagons, 3 of iron castings, 5 flour mills, and 2 saw mills. Capital, Monmouth. **XIII.** A S. county of Iowa, intersected by South, Middle, and North rivers, and drained by several other tributaries of the Des Moines, which crosses the N. E. corner; area, 482 sq. m.; pop. in 1870, 17,980. It has a diversified surface of prairie and woodland, and the soil is very fertile. Bituminous coal is abundant. A branch of the Chicago, Rock Island, and Pacific railroad from Des Moines terminates at the county seat. The chief productions in 1870 were 406,472 bushels of wheat, 1,925,914 of Indian corn, 169,217 of oats, 114,885 of potatoes, 382,568 lbs. of butter, 74,957 of wool, and 24,517 tons of hay. There were 7,830 horses, 5,660 milch cows, 9,826 other cattle, 24,569 sheep, and 31,582 swine; 2 flour mills, 21 saw mills, and 1 woollen mill. Capital, Indianola. **XIV.** An E. county of Missouri, bounded S. by the Missouri river; area, 350 sq. m.; pop. in 1870, 9,673, of whom 741 were colored. It has a varied surface, and the soil, especially along the river, is extremely fertile. Limestone and sandstone of excellent quality abound. The St. Louis, Kansas City, and Northern railroad passes through it. The chief productions in 1870 were 252,187 bushels of wheat, 729,010 of Indian corn, 415,375 of oats, 55,373 of potatoes, 209,662 lbs. of butter, 32,475 of wool, 296,745 of tobacco, and 3,948 tons of hay. There were 3,567 horses, 3,528 milch cows, 4,233 other cattle, 8,016 sheep, and 21,990 swine; 10 manufactories of furniture, 8 flour mills, and 4 saw mills. Capital, Warrenton.

WARREN. I. James, an American patriot, born in Plymouth, Mass., Sept. 28, 1726, died there, Nov. 27, 1808. He graduated at Harvard college in 1745, and became a merchant. In 1757 he was appointed high sheriff. He was a member of the general court in 1766, and during the revolution speaker of the house of representatives. In 1772 he proposed the establishment of committees of correspondence in the colony, a measure generally adopted. **II. Mercy,** an American authoress, wife of the preceding, born in Barnstable, Mass., Sept. 25, 1728, died in Plymouth, Oct. 19, 1814. She was the sister of James Otis, the patriot and orator, and was married at the age of 26. She corresponded with the two Adamses, Jefferson, and other distinguished patriots, who were accustomed to consult her on momentous occasions. Her earliest productions were political satires in a dramatic form, and in 1790 she published a volume of poems, including two tragedies, entitled "The Sack of Rome" and "The Ladies of Castile." Her most important work, however, was a "History of the American Revolution" (3 vols. 8vo, Boston, 1805), prepared from notes taken during the war.

WARREN, Sir John Borlase, an English admiral, born at Stapleford, Nottinghamshire, in 1754, died in Greenwich, Feb. 27, 1822. He was a midshipman on the Alderney sloop of war for some time in the North sea, and afterward studied at Cambridge. In 1774 he entered parliament, and in 1775 was created a baronet. When the American war began, he became a lieutenant in the Nonsuch, and in 1779 commander of the Helena sloop of war. In 1780 he was reëlected to parliament, and in 1781 attained the rank of post captain. In 1793, on the commencement of the war with France, he was appointed to the Flora frigate, and in 1795 commanded the unsuccessful expedition to Quiberon bay to assist the insurrectionists of La Vendée. In 1797 he obtained the command of the Canada of 74 guns, and after some severe service off Brest went with a strong force to the coast of Ireland, where on Oct. 11, 1798, in a conflict with a French squadron, he captured the Hoche line-of-battle ship and three frigates. For this he was made rear admiral of the blue, with the thanks of parliament. In 1793 he was elected to parliament for Nottingham, and in 1802 reëlected. After the peace of Amiens he was sent to Russia as ambassador. In 1812 he had command in North America and the West Indies. At his death he was admiral of the white. He is the supposed author of "A View of the Naval Force of Great Britain" (8vo, 1791).

WARREN. I. Joseph, an American patriot, born in Roxbury, Mass., June 11, 1741, killed in the battle of Bunker Hill, June 17, 1775. He graduated at Harvard college in 1759, studied medicine, and at the age of 23 commenced practice in Boston. When Samuel Adams declined to deliver the address on the second anniversary of the Boston massacre, March 5, 1772, Warren was invited to discharge the duty, and acquitted himself with great ability. In 1775 he again delivered the address, although with considerable danger, from the increased exasperation between the troops and the citizens. In 1772 he was a member of the committee of correspondence with the several towns in Massachusetts. Later he was a delegate to the convention of Suffolk county which met to prevent Gov. Gage from fortifying the southern entrance of Boston. As chairman of the committee appointed to address the governor on the subject, he sent him two papers, both written by himself, which were afterward communicated to the continental congress. He was a delegate to the Massachusetts congress in 1774, and was made president, and also chairman of the committee of public safety. To his energy was in great measure due the successful result of the battle of Lexington. On June 14, 1775, the Massachusetts congress commissioned him as major general. When Prescott and Putnam favored the defensive occupation of Charlestown heights, he objected because of an insufficiency of ammunition for repelling an attack. But when a majority of the council of war determined to fortify Bunker Hill, he resolved to take part. He was warned by Elbridge Gerry against the hazard of exposing his person. "I know that I may fall," was the reply, "but where is the man who does not think it glorious and delightful to die for his country?" About 2 o'clock he went to Bunker Hill unattended, and with a musket in his hand. He was offered the command by Putnam and by Col. Prescott, but fought only as a volunteer. He was one of the last to retire from the field, and Major Small of the British army called out to him by name from the redoubt and begged him to surrender, at the same time commanding his men to cease their fire. As he turned around at the voice a ball struck him in the forehead, killing him instantly. A statue of Gen. Warren, by Henry Dexter, was unveiled on Bunker Hill, June 17, 1857. His life has been written by A. H. Everett in Sparks's "American Biography," and by Richard Frothingham (Boston, 1865). **II. John,** an American physician, brother of the preceding, born in Roxbury, Mass., July 27, 1753, died in Boston, April 4, 1815. He graduated at Harvard college in 1771, studied medicine, and began practice in Salem in 1773. He was with the Salem regiment in the battle of Lexington, and remained at Cambridge in charge of the wounded. In June he was appointed senior surgeon to the hospital. He accompanied the army during two years, and was then appointed to the charge of the military hospitals in Boston. He joined the expedition of Gen. Greene to Rhode Island in 1778, and another against the insurgent Shays in 1786. In 1780 he gave a course of dissections to his colleagues; this led to the establishment of a medical school under his auspices attached to Harvard college, in which he was appointed professor of anatomy. In surgery he introduced many operations previously unknown in the country. In 1783 he delivered the first of the series of fourth of July orations in Boston. He published several addresses and essays, and contributed many valuable papers to the "New England Journal of Medicine and Surgery," the "Memoirs" of the American academy, and the "Communications" of the Massachusetts medical society. **III. John Collins,** son of the preceding, born in Boston, Aug. 1, 1778, died there, May 4, 1856. He graduated at Harvard college in 1797, studied medicine with his father and in London, Edinburgh, and Paris, and returned to Boston in 1802. In 1806 he was chosen adjunct professor of anatomy and surgery in Harvard college, and in 1815 succeeded to his father's professorship, and also to his practice. He was one of the founders of the Massachusetts general hospital, of which he was principal surgeon till his death. In 1828 he became associate editor of the "Boston Medical and Surgical Journal." He made a second and a third visit to Europe in 1837 and 1852. In 1846 he was the first person who employed ether in a surgical operation. He was a founder of the McLean asylum for the insane, and was president of the Massachusetts medical society from 1832 to 1836. Besides numerous scientific papers, he published "Diseases of the Heart" (1809); a "Comparative View of the Sensorial System in Man and Animals" (1822); "Remarks on Dislocation of the Hip Joint" (1826); "Surgical Observations on Tumors" (1837); "Etherization" (1848); and "Mastodon Giganteus" (1855). A memoir of Dr. Warren has been published by his brother, Edward Warren, M. D. (2 vols. 8vo, Boston, 1860). **IV. Jonathan Mason,** son of the preceding, born in Boston in 1811, died there, Aug. 19, 1867. He graduated in the medical department of Harvard university in 1832, studied in Paris and London, and was for 20 years attending surgeon to the Massachusetts general hospital. He published "Surgical Observations, with Cases and Operations" (Boston, 1867).

WARREN, Samuel, an English author, born in Denbighshire, May 23, 1807, died July 31, 1877. He began the study of medicine at Edinburgh, but in 1828 entered the Inner Temple, London, and in 1837 was called to the bar. In 1830-'31 he contributed to "Blackwood's Magazine" "Passages from the Diary of a late Physician," which attracted wide attention and were supposed to be true. His more celebrated work, "Ten Thousand a Year," begun in "Blackwood's Magazine" in 1839, is written strongly in the interest of the conservative party in England. It was followed by the far inferior novel "Now and Then" (1847). In 1851, on the opening of the crystal palace, he published an allegorical poem, "The Lily and the Bee." In 1854 his shorter contributions to "Blackwood's Magazine" were published in two octavo volumes called "Miscellanies, Critical and Imaginative." Mr. Warren also published "A Popular and Practical Introduction to Law Studies" (1835; 3d ed., rewritten and enlarged, 1863; Albany, N. Y. 1870); "Select Extracts from Blackstone's Commentaries, with a Glossary, Questions, and Notes" (1837); "The Opium Question" (1840); "Moral, Social, and Professional Duties of Attorneys and Solicitors" (1848); "Manual to the Parliamentary Law of the United Kingdom" (1852); "The Intellectual and Moral Improvement of the Present Age" (1853); and "Labor, its Rights, Difficulties, Dignity, and Consolations" (1856). His literary works have been published in five volumes (1853–'5). In 1851 Mr. Warren was made queen's counsel, and from 1854 to 1874 he was recorder of Hull. In 1856 he was elected to parliament for Midhurst, and was reëlected in 1857, but resigned in 1859, being made one of the masters in lunacy.

WARREN, William, an American actor, born in Philadelphia, Nov. 17, 1812. He made his first appearance on the stage in the Arch street theatre, Philadelphia, as "Young Norval," Oct. 27, 1832. In 1841 he played in the Park theatre, New York, and in 1845 in the Strand theatre, London. On the opening of the Howard Athenæum, Boston, Oct. 5, 1846, he appeared as Sir Lucius O'Trigger in "The Rivals," and won an immediate and immense popularity in that city. On Aug. 23, 1847, he appeared as Billy Lackaday in the Boston museum, with which theatre he has ever since been connected. He especially excels in the old English comedies.

WARREN, William Fairfield, an American clergyman, born in Williamsburg, Mass., March 13, 1833. He graduated at Wesleyan university in 1853, joined the New England Methodist conference in 1855, and afterward studied theology at Andover, Berlin, and Halle. In 1857 he was a delegate to the world's convention of the evangelical alliance at Berlin, afterward making a tour through the East. In 1861 he was appointed professor of systematic theology in the Methodist Episcopal mission theological institute at Bremen, Germany (which afterward became the Martin institute at Frankfort), and in 1866 in the Boston theological seminary, subsequently a college of the Boston university, of which institution Dr. Warren has been president since 1873. He has published *Anfangsgründe der Logik* (Bremen, 1864), and *Einleitung in die systematische Theologie* (part i., Bremen, 1865).

WARRICK, a S. W. county of Indiana, separated from Kentucky by the Ohio river; area, 360 sq. m.; pop. in 1870, 17,653. It has a rolling surface, and the soil is very fertile. Bituminous coal is found. It is intersected by the Wabash and Erie canal, and the Lake Erie, Evansville, and Southwestern railroad terminates at the county seat. The chief productions in 1870 were 150,746 bushels of wheat, 601,054 of Indian corn, 123,143 of oats, 43,799 of Irish and 17,627 of sweet potatoes, 185,408 lbs. of butter, 30,979 of wool, 3,611,775 of tobacco, and 11,282 tons of hay. There were 5,008 horses, 3,457 milch cows, 5,328 other cattle, 16,749 sheep, and 21,739 swine; 8 manufactories of carriages and wagons, and 4 flour mills. Capital, Boonville.

WARRINGTON, Lewis, an American naval officer, born in Williamsburg, Va., Nov. 3, 1782, died in Washington, D. C., Oct. 12, 1851. He graduated at William and Mary college in 1798, entered the navy as a midshipman in 1800, and served under Commodore Edward Preble in the war with Tripoli. In 1807 he was made a lieutenant, and was attached to the Chesapeake in her rencounter with the British ship of war Leopard on June 22. In July, 1813, he was made master commandant, and in March, 1814, sailed from New York in command of the Peacock, 18. On April 29 he fell in off Cape Canaveral, Florida, with a convoy of British merchantmen under the protection of the Epervier sloop of war, and, after a close conflict at yardarm and yardarm for 42 minutes, captured her with 128 men and £118,000 in specie. At the end of October the Peacock arrived at New York, having captured, principally in the bay of Biscay, 14 British merchantmen. In November, 1814, he was made captain, and sailed from New York, still in command of the Peacock, in the squadron of Commodore Stephen Decatur, jr. On June 30, 1815, the Peacock, in the strait of Sunda, fell in with the East India company's cruiser Nautilus, Capt. Boyce, and, having no knowledge that peace had been concluded, exchanged broadsides with her, when the Nautilus struck, having six killed and eight wounded. The Peacock sustained no injury. The Nautilus was immediately given up, and the Peacock returned to the United States. Capt. Warrington subsequently commanded a squadron on the West India station. From 1827 to 1830, and from 1840 to 1842, he served as a member of the board of navy commissioners; and in September, 1842, he was appointed chief of the bureau of ordnance.

WARSAW (Pol. *Warszawa;* Ger. *Warschau;* Fr. *Varsovie*). **I.** A government of Russian Poland, bordering on Plock, Lomza, Siedlce, Radom, Piotrków, Kalisz, and the Prussian province of Posen; area, 5,622 sq. m.; pop. in 1870, 925,639. It is a level country, drained by the Vistula and its tributaries, the Pilica and Bzura. The most fertile part is adjacent to the capital. It is traversed by several railways, and there are more then 300 manufactories of cloth and other articles. **II.** A city, capital of the government and of the kingdom of Poland, on the left bank of the Vistula, in lat. 52° 13′ N., lon. 21° 3′ E., 625 m. S. S. W. of St. Petersburg and 320 m. E. of Berlin; pop. in 1873, 279,502, including 164,000 Catholics, 93,200 Jews, 14,000 German Protestants, and

8,300 members of the Greek church. It has an area of 15 sq. m., including 5 sq. m. of open spaces. Most of the city is well built, and hundreds of new structures have been erected recently. It is surrounded by ditches and walls, and has eight gates and an almost impregnable citadel. The fortified suburb of Praga, opposite Warsaw, is reached by a long and magnificent iron bridge, built in 1865, instead of the former bridge of boats. The principal parade ground is the Champ de Mars. The finest of about a dozen squares are the Saxon square, with an obelisk in honor of the Poles who remained faithful to Russia in the insurrection of 1830; the square named after Sigismund III., with that monarch's statue on a lofty column; and the Marieville bazaar, with arcades like those of the Palais Royal in Paris. The most celebrated avenues are the Cracow Suburb, with Thorwaldsen's equestrian statue of Prince Joseph Poniatowski, and the New World. Several avenues are planted with poplar and chestnut trees. In 1721 Augustus II. laid out magnificent gardens, which with the Krasinski palace and garden, Constantine square (1867), the royal and Brühl palaces, and the English park in the Belvedere, are among the chief attractions of Warsaw. Roman Catholic and Greek archbishops reside here. There are about 20 Catholic churches, including the cathedral dating from 1360, which communicates with the royal palace. The Greek cathedral of 1842 is very handsome, and that of the Lutherans is the finest of all. The Reformed church is modelled after the Roman Pantheon. There are several large synagogues. The most imposing public building is the royal palace, built by Sigismund III. on high ground commanding the river, and embellished by his successors. It has splendid apartments, where the senate and diet formerly met, and the archives are preserved here. The Saxon palace was the residence of several kings of that line. These and other public and private palaces impart grandeur to the city. Of its former treasures, the Zaluski library of 300,000 volumes and other spoils of local collections were in 1795 transferred to the imperial library at St. Petersburg. Among other prominent edifices are the extensive new government palace, a grand theatre, the mint, bank, post offices, and the railway depots in the outskirts, belonging to lines which connect Warsaw with St. Petersburg, Moscow, Cracow, Berlin, Dantzic, and other places, and communicating by horse cars with all parts of the city. The university was suspended with other institutions after the revolution of 1830–'31, but reopened in 1869; in 1873 it had 946 students and 66 professors. Connected with it are many laboratories, an observatory, and a botanic garden. The other educational institutions include a theological and a rabbinical seminary, several gymnasiums (one for females, who have special schools besides), a school of design, a conservatory of music established in 1860 and attended in 1876 by about 200 pupils, and more than 60 common and Sunday schools and over 100 private ones. The weekly grain, cattle, and horse markets, and the annual market for wool, are numerously attended, as well as the fairs in May and September. In 1872 there were 265 manufactories of cloth, carpets, pianos, carriages, wagons, saddlery, machines, and numerous other articles, employing 7,234 persons, and producing goods valued at 14,332,788 rubles, being 2,745,953 more than in 1871, and the subsequent increase was still larger. Adjacent to the city are memorable battle grounds, and the Lazienki, imperial, and other palaces, a park, a zoölogical garden with a picture gallery, the Królikarnia or Rabbit garden, and museums, villas, and pleasure resorts.—Warsaw is first mentioned in history early in the 13th century. Subsequently it was the capital of the dukes of Masovia till 1526, when they became extinct. In the next generation it was the residence of King Sigismund II., and from the latter part of the 16th century the Polish kings were elected in the neighboring grounds of Wola. In 1609, under Sigismund III., it became the permanent capital, although the coronations continued to take place at Cracow. In 1655 it surrendered to Charles X. of Sweden, and was recovered in 1656 by John Casimir of Poland; but the Poles were overwhelmed at Praga by the Swedish monarch and the elector Frederick William of Brandenburg in a three days' battle, and capitulated on July 30. In 1705 Charles XII. occupied it for a short time previous to his conferring the Polish crown on Stanislas Leszczynski. Under the electors of Saxony Warsaw became one of the most brilliant capitals of Europe. The Russians occupied the city from 1764 to 1774. They returned in 1793. The massacre of their garrison in April, 1794, was followed from July till September by a Prussian siege; and Warsaw was finally obliged to surrender to Suvaroff (Nov. 8), after the murderous storming of its suburb. (See PRAGA.) The third partition of Poland placed it under Prussian rule, which in November, 1806, was terminated by the French occupation. The treaty of Tilsit of 1807 created the duchy of Warsaw, to which the treaty of Vienna of 1809 added western Galicia, increasing the population from 2,200,000 to 3,780,000. King Frederick Augustus of Saxony was at the head of the duchy till the end of the disastrous Franco-Russian campaign of 1812. The Russians reëstablished their rule over Warsaw early in 1813. In the night of Nov. 29-30, 1830, began at Warsaw the grandest Polish struggle for independence, which virtually ended with the capture of the city by the Russians under Paskevitch, Sept. 8, 1831. The citadel and other strong works were soon erected to control the city; the principal learned institutions were closed; and, as most families were in mourning for fallen kinsmen and the lost cause, Warsaw presented for a long time a desolate appearance. The demonstrations in February and April, 1861, were put down with a strong hand; and the insurrection of 1863, controlled by the Warsaw central committee, was finally crushed early in 1864. The university was reorganized in 1869 in a Russianized form, and many other efforts were aimed at the extirpation of the last vestiges of Polish nationality; but the Polish language and the Catholic religion still preponderate, despite systematic measures for their restriction.

WART, an excrescence on the skin, consisting of elongated papillæ of the dermis covered with cuticle, the nature of which is not very well understood. Warts are often superficial and movable, but generally implanted in the substance of the true skin, where they are retained by dense, whitish, fibrous filaments. The common flat wart is formed of small separate prolongations of the dermis, giving to it a furrowed or rough appearance; the shape is usually rounded, and the tissue is firm and fibrous, sometimes almost cartilaginous; it is insensible at the surface, sensitive at the base, receiving small vessels which yield blood on incision; it is commonly painless, paler than the surface on which it rests, and seated principally on the hands. Warts are sometimes produced by compression and by neglect of cleanliness, and by the syphilitic virus about the openings of the mucous canals, showing the analogy between the skin and the mucous membranes; they come and go without apparent cause, especially in the young, and may go on increasing in spite of all treatment. The hard variety is not communicable by contact, but in some situations, where the cuticle is delicate, they exude a serous fluid which is commonly considered contagious. The pediculated warts are more vascular and redder, and either hard or soft; they are most common on the neck, chest, and back.—The most approved methods of treatment are by caustics, excision, and ligature, the last especially for the pediculated kinds. A common way is to pare the wart, without bringing blood, and touch with nitrate of silver, or, if this be too slow, to put on nitric or sulphuric acid, which penetrate more deeply, and sometimes too deeply, injuring joints or making indelible scars. Other methods are to touch with a mixture of one part of muriatic acid and three parts of muriated tincture of iron; with a solution of diacetate of lead; with corrosive sublimate, muriate of ammonia, and alum solutions; with muriate of soda and vinegar; with chloride of ammonia; with lime water; or with vegetable juices, as those of the garlic, onion, and sumach. Poultices of scraped carrots and the application of quicklime will sometimes cause their fall; and rubbing with chalk or a fine file is a favorite means of removal.

WARTBURG, an old castle in the N. W. part of the Thuringian forest, near Eisenach, Saxe-Weimar. The site, a wooded hill surrounded by rocky glens, is extremely picturesque. The castle was built about 1070 by Louis, landgrave of Thuringia, and it remained the residence of his successors nearly four centuries. In 1206 or 1207 the landgrave Hermann I. assembled there the principal minnesingers of Germany for a musical tournament, at which party feeling ran so high that it became known as the Wartburg war. A poem descriptive of the contest, entitled *Kriec von Wartburg*, appeared about 1300 (German translation, edited by Karl Simrock, 1874). Connected with the castle also is the romance of St. Elizabeth of Hungary, wife of the landgrave Louis, son of Hermann, whose story has been set to music by Liszt under the title *Die heilige Elisabeth.* (See ELIZABETH, SAINT.) Luther found shelter in the Wartburg after the diet of Worms, and occupied himself, during his residence there from May 4, 1521, to March 6, 1522, with his translation of the Bible. The celebration here by German students of the third centenary year of the reformation, Oct. 18, 1817, is known as the Wartburg festival; the participants in it were suspected of liberalism and subjected to long continued political persecution. The castle was thoroughly restored in 1847, and adorned by Moritz von Schwind with frescoes illustrating the scenes in its history. In 1867 was celebrated the eighth centenary year of its foundation.

WART HOG, a name given to the African swine of the genus *phacochœrus* (F. Cuv.), from the large warty protuberances on each cheek. In this genus the feet are four-toed; there is a thick callosity in front of each fore limb, produced by their habit of falling on their knees when digging for the bulbs and roots on which they feed; the warts are about 1½ in. below the eyes, made up of fibrous tissue mixed with fat; the eyes are very small and high up, ears large, and sense of smell acute; there are 13 dorsal and 6 lumbar vertebræ; tail naked and slender, tapering, but dilated and tufted at the end; the molar teeth vary, according to age, from 3 to 5 on each side in each jaw, and are composed of closely set cylindrical tubes surrounded by enamel, the last being very long; canines large, projecting upward and outward; incisors $\frac{2}{6}$ or $\frac{2}{4}$, generally deciduous. The length is between 3½ and 4 ft., with a tail of 1 ft.; though small, they have a large head with formidable tusks, and a very fierce and unprepossessing look. The mammæ are four, two inguinal and two abdominal, an inch behind the navel; the roof of the mouth has more than 20 transverse arched ridges; the intestinal canal is about eight times the length of the body; the stomach is more simple than in the common hog, the small intestines relatively shorter, and the large relatively longer; the pharynx has two large mucous pouches. The best known species is the African wart hog or *haruja* (*P. Æliani*, Rüpp.), from Abyssinia and the Guinea and Mozambique coasts; it has persistent incisors, with scanty long bristles of a light brown color, and a mane between the ears extending along the neck and back, sometimes 10 in. long.—In the allied genus *potamochœrus* (Gray), or river hogs, the ears are elongated, tapering, ending in a pencil of hairs; the face is elongated, and is rendered hideous by a long protuberance on each side, half way between the nose and eyes; tail thick, high up the rump; upper part of intermaxillary bones swollen and rough; upper canines large, arising from a prominent bony case on the side of the jaws, and curved upward. The masked water hog, or *bosch vark* (*P. Africanus*, Gray), is generally black, with whitish cheeks having a large central black spot; it is an inhabitant of S. Africa, and is very savage and ill-looking. The painted pig of the Cameroons (*P. penicillatus*, Schinz), from the Gold coast of W. Africa, is bright red bay, with black face, forehead, and ears. These hogs are hunted for their flesh.—See Andersson's "Okavango River" (1861).

Masked Water Hog (Potamochœrus Africanus).

WARTON. I. Joseph, an English author, born at Dunsford, Surrey, in 1722, died at Wickham, near London, Feb. 23, 1800. He was educated at Winchester and Oxford, and became curate of Basingstoke. In 1746 he published "Odes on Various Subjects" (4to, London), and in 1748 was presented to the rectory of Winslade. He made a translation of the Eclogues and Georgics of Virgil, added to it Christopher Pitt's version of the Æneid, and published the whole in 1753 (4 vols. 8vo). Soon afterward he contributed 24 critical papers to the "Adventurer." In 1754 he was made rector of Tunworth, and in 1755 second master of Winchester school. In 1756 he published the first volume of his "Essay on the Writings and Genius of Pope," the work upon which his reputation chiefly rests, and of which the second volume did not appear till 1782. From 1766 to 1793 he was head master of Winchester school, in 1782 was made a prebendary of St. Paul's, and in 1788 of Winchester. His edition of Pope's works (9 vols. 8vo) appeared in 1797, and about the same time he began an edition of Dryden, which was completed after his death (4 vols. 8vo, 1811).—See "Biographical Memoirs of the late Rev. Joseph Warton, D. D.," by the Rev. John Wooll (4to, London, 1806). **II. Thomas,** brother of the preceding, born in Basingstoke in 1728, died in Oxford, May 21, 1790. In May, 1743, he became a commoner of Trinity college, Oxford, and in 1745 contributed to "Dodsley's Museum" a song and a prize essay. In 1747 he published a poem on "The Pleasures of Melancholy," and in 1749 "The Triumph of Isis," an answer to Mason's anti-Jacobite poem, "Isis, an Elegy." In 1751 he became a fellow of Trinity college, where he spent the remainder of his life. His "Observations on the Faerie Queene of Spenser" (1754) gave him a high reputation as a critic. From 1757 to 1767 he was professor of poetry, an office held by his father, Thomas Warton, D. D., in 1718–'28. He published an edition of Theocritus (2 vols. 4to, 1770), and *Inscriptionum Romanarum Metricarum Delectus* (4to, London, 1758). Among his remaining works are: "The Oxford Sausage, or Select Pieces written by the most celebrated Wits of the University of Oxford" (1764); an edition of the Greek anthology (1766); and "The History of English Poetry, from the close of the Eleventh to the commencement of the Eighteenth Century, to which are prefixed two Dissertations: 1, on the Origin of Romantic Fiction in Europe; 2, on the Introduction of Learning into England" (vol. i., 1774; ii., 1778; iii., 1781; and a fragment of vol. iv., to the end of the reign of Elizabeth). In the edition of Richard Price many of Warton's mistakes are corrected (4 vols. 8vo, London, 1824; new ed., 3 vols., 1840). In 1785 he was elected Camden professor of ancient history, and succeeded Whitehead as poet laureate. In 1802 Dr. Mant, bishop of Down, published an edition of "The Poetical Works of the late Thomas Warton, B. D." (2 vols. 8vo), with an account of his life.

WARVILLE, Brissot de. See Brissot.

WARWICK, a S. E. county of Virginia, on the peninsula between the York and James rivers, bordering on the latter, and drained by several small streams; area, 95 sq. m.; pop. in 1870, 1,672, of whom 1,052 were colored. The surface is undulating, and the soil very fertile. Oysters and firewood are largely exported. The chief productions in 1870 were 4,350 bushels of wheat, 35,794 of Indian corn, 7,653 of oats, 4,210 of Irish and 2,217 of sweet potatoes. There were 140 horses, 246 milch cows, 329 other cattle, and 1,140 swine. Capital, Warwick Court House.

WARWICK, a town of Kent co., Rhode Island, 10 m. S. by W. of Providence, bordering on Narragansett bay and intersected by the Stonington and Providence railroad; pop. in 1870, 10,453; in 1875, 11,614. In the town are several villages engaged in manufactures, the principal of which are Natick, Phœnix, Centreville, River Point, Lippitt, Arctic, and

Crompton. The Warwick railroad extends to Rocky Point and Oakland Beach, popular summer resorts. Drum rock, near the village of Apponaug, is a large rock so nicely balanced upon another that a boy can set it in motion, producing a drum-like noise which can be heard for several miles. There are in the town 22 cotton mills, 2 woollen mills, 2 bleacheries, and 2 calico works, 2 banks, 2 newspaper offices, 15 churches, and 20 public and private schools. It is one of the oldest towns in the state, having been settled previous to 1642.

WARWICK, a municipal and parliamentary borough of England, capital of Warwickshire, on the right bank of the Avon, here crossed by a stone bridge, and on the London and Northwestern railway, 85 m. N. W. of London; pop. in 1871, 10,986. It is an ancient place, and contains one of the finest feudal castles in the kingdom. One of the towers, 128 ft. high, dates from the latter part of the 14th century; another, 147 ft. high, is still older, but of uncertain date. This castle was partially burned, Dec. 3, 1871, and some of its paintings, suits of armor, and other antiquities were lost. Its valuable collections had long been open to the public, and the restoration of the castle was begun by subscription prior to 1873. The town has some manufactures.

Warwick Castle.

WARWICK, Guy, earl of, a legendary English champion, supposed to have flourished in the time of the Saxon king Athelstan, though his existence at any period is problematical. Chaucer mentions the romance of "Sir Guy" in the "Canterbury Tales." Ellis, in his "Specimens of Early English Metrical Romances," suggests that an Icelandic warrior, Egil, who contributed materially to Athelstan's victory over the Danes at Brunanburg, may be the legendary Guy; Dugdale even fixes the date of his combat with the Danish giant Colbrand in 926, when he supposes Guy to have been 67 years old; and Shakespeare alludes to "Colbrand, the giant," in "King John," and to Colbrand and Sir Guy in "Henry VIII." The romance of Sir Guy cannot be traced with certainty further than the early part of the 14th century, though it is evidently founded upon Anglo-Norman materials. "The Booke of the most victoryous Prince Guy of Warwick," in metrical form, was printed by William Copland before 1567. There is a prose French romance of Sir Guy printed in 1525, which has been edited by J. Zupitza for the early English text society (parts i. and ii., 1875–'6).

WARWICK, John Dudley, earl of. See Dudley.

WARWICK, Richard Neville, earl of, surnamed "the king-maker," eldest son of Richard Neville, earl of Salisbury, born soon after 1420, killed at the battle of Barnet, April 14, 1471. About 1449 he married Anne, daughter and heiress of Richard de Beauchamp, earl of Warwick, and on his death in that year was created earl in his place. Through the marriage of his father's sister with the duke of York he was first cousin of the earl of March, afterward Edward IV. He possessed enormous wealth, and his courage, intelligence, eloquence, frank and generous bearing, and liberality, won the affections of all classes. He first distinguished himself as a soldier in an incursion with his father and the earl of Northumberland across the Scottish border in 1448. He had the credit of the victory of the Yorkists over the Lancastrians at St. Albans, May 22, 1455, and was made governor of Calais, and later commander of the fleet for five years. In May, 1458, he attacked a fleet of 28 sail belonging to Lübeck, and captured six of them after a battle of six hours. The wars of the roses broke out afresh in 1459, and Warwick joined his father with a large body of troops at Ludlow castle. The surrender of the Yorkists in October cost him his naval office, but he kept possession of Calais by force. With a fresh army of 1,500 men he crossed over to England in June, 1460, and marched upon London. King Henry fled; 40,000 soldiers flocked to Warwick's standard; the city threw open its gates; and in the victory of Northampton, July 10, the Yorkists captured the king. (See Henry VI.) The Yorkist troops, defeated by Queen Margaret at Wakefield, Dec. 30, where Richard of York was killed and Warwick's father captured and beheaded, rallied under Warwick at Bernard's Heath, near St. Albans, Feb. 17, 1461, and suffered another defeat. Henry was set at liberty, but Edward of York effected a junction with Warwick's forces and compelled the royal army to retire to the north. Warwick and Edward entered London in triumph, and the young duke was proclaimed king, March 4, under the title of Edward IV.; and on the 29th Warwick defeated Henry at Towton. In 1462 Warwick recaptured several fortresses from Queen Margaret; and his brother Lord Montacute finally defeated the Lancastrians at Hexham, May 15, 1464. In June, 1465, Henry was betrayed, and Warwick conducted him to the tower. The Neville family meanwhile had governed the new king and the kingdom, Warwick being made chief minister and general, warden of the west marches, and chamberlain, his brother George archbishop of York and lord high chancellor, and Lord Montacute warden of the east marches of Scotland and earl of Northumberland. But the royal favors now began to flow in another channel. Edward had married in 1464 Elizabeth Woodville, the widow of Sir John Grey, and the Woodvilles soon supplanted the Nevilles in the confidence of the king. The royal marriage had given Warwick great offence; the marriage of Margaret, the king's sister, to Charles the Bold, duke of Burgundy, gave still more; and Edward was equally displeased by the secret marriage in 1469 of his brother Clarence to Warwick's daughter Isabella. Just at this time an insurrection broke out in Yorkshire, ostensibly to resist an obnoxious tax. The Nevilles seized the opportunity to overthrow their rivals. The tax was soon forgotten, and the insurgents rallied under Warwick and Clarence, who defeated part of the royal forces at the battle of Edgecote, July 26, 1469, captured and beheaded the father and brother of the queen, and led Edward prisoner to Middleham. The Lancastrians raised the standard of the red rose in Scotland, but Warwick defeated them. Soon afterward Edward, released from prison, reappeared in London, pardoned Warwick and Clarence, and restored them to his confidence. Another quarrel and another reconciliation followed; and when an insurrection broke out in Lincolnshire in 1470, Warwick and Clarence, though they accepted the king's commission to subdue it, were secretly the instigators of the movement, designing to place the crown on Clarence's head. They soon threw off disguise, and, when hard pressed by the royal forces, escaped from Dartmouth on shipboard with many followers, and landed at Harfleur. In France Warwick met Queen Margaret, with whom, by the influence of Louis XI., he was reconciled, and arranged a plan for restoring Henry VI. to his throne, Clarence being guaranteed the next succession, in default of male issue to Henry. Louis furnished the means for the expedition, and Edward having been decoyed into the north by a pretended insurrection, the exiles landed at Plymouth and Dartmouth, Sept. 13, 1470, proclaimed Henry king, and marched upon the capital. Edward fled to Holland; Henry was taken from the tower, and the Nevilles were reinstated in their offices and honors, Warwick receiving in addition the post of lord high admiral. In the mean time Edward had received secret aid from the duke of Burgundy, and landed on the English coast with 2,000 well armed Englishmen, March 14, 1471. Clarence, with whom he had long had a secret understanding, came over to his side; he entered London without resistance, and the archbishop delivered to him the imbecile Henry, whom he again sent to the tower, where he died in May. Two days afterward he left the city, and attacked Warwick at Barnet, April 14. Enveloped in a thick mist, the two armies fought at random for three hours, Edward being successful on the right, and Warwick on the left. The field soon became a scene of hopeless confusion, the Lancastrians falling upon their own men as they returned from pursuing the enemy. Edward was victorious after 7,000 of his adversaries had lost their lives. Warwick and his brother Montacute were among the slain, and their bodies were exposed naked for three days on the pavement of St. Paul's, and then buried in the ancestral tomb in Bisham abbey, Berkshire.

WARWICKSHIRE, a midland county of England, bordering on the counties of Leicester, Northampton, Oxford, Gloucester, Worcester, and Stafford; area, 881 sq. m.; pop. in 1871, 633,902. With the exception of two ridges of low hills which skirt the S. border of the county, and among which is Edgehill, famous for the first battle in the civil war of Charles I., the surface consists chiefly of a succession of gentle eminences. The soil is of very various qualities, but generally good. Timber is abundant, especially in the centre of the county, which was once occupied by the forest of Arden; and there is a large coal field. The only navigable river is the Avon, but ample intercommunication is afforded by canals and railways. Warwickshire includes the great manufacturing towns of Birmingham and Coventry, Warwick, the county town, Stratford-upon-Avon, Kenilworth, Leamington Priors, and Rugby.

WASCO, a N. central county of Oregon, bounded N. by Washington territory, from which it is separated by the Columbia river, bordering W. on the Cascade mountains, and watered by Des Chutes and John Day's rivers; area, about 12,000 sq. m.; pop. in 1870, 2,509, of whom 27 were Chinese; in 1875, 3,853. It is best adapted to grazing, but the river valleys have a productive soil. The chief productions in 1870 were 10,599 bushels of wheat, 9,045 of Indian corn, 26,593 of oats, 7,203 of barley, 12,962 of potatoes, 38,106 lbs. of wool, 43,901 of butter, and 2,330 tons of hay. There were 2,432 horses, 8,778 cattle, 6,859 sheep, and 1,069 swine. Capital, The Dalles.

WASECA, a S. county of Minnesota, intersected by Le Sueur river, an affluent of the

Blue Earth river; area, 432 sq. m.; pop. in 1870, 7,854; in 1875, 9,994. The surface is undulating, diversified by prairie and woodland, and the soil is fertile. It is traversed by the Winona and St. Peter railroad. The chief productions in 1870 were 400,288 bushels of wheat, 98,478 of Indian corn, 208,243 of oats, 30,092 of potatoes, 224,227 lbs. of butter, and 20,445 tons of hay. There were 2,043 horses, 2,593 milch cows, 4,272 other cattle, 2,617 sheep, and 3,188 swine. Capital, Waseca.

WASHINGTON, a territory of the United States, between lat. 45° 30′ and 49° N., and lon. 117° and 124° 45′ W.; greatest length, E. and W., 340 m.; greatest breadth, 240 m.; area, 69,994 sq. m. It is bounded N. by the strait of Fuca (separating it from Vancouver island) and British Columbia; E. by Idaho, from which it is partly separated by Snake river; S. by Oregon, from which it is mostly separated by Columbia river; and W. by the Pacific ocean and the canal de Haro, the latter connecting the strait of Fuca and the gulf of Georgia, and separating Washington from Vancouver island. It is divided into 24 counties, viz.: Chehalis, Clallam, Clarke, Columbia, Cowlitz, Island, Jefferson, King, Kitsap, Klikitat, Lewis, Mason, Pacific, Pierce, San Juan, Skamania, Snohomish, Stevens, Thurston, Wahkiakum, Walla Walla, Whatcom, Whitman, Yakima. The principal cities and towns, all small, are Olympia (the capital), Port Townsend, Seattle, Steilacoom, Tacoma, and Tumwater, on Puget sound; Kalama and Vancouver, on Columbia river, W. of the Cascade mountains; and Walla Walla, in the S. E. part of the territory. The population in 1853 was 3,965; in 1860, 11,594; in 1870, 23,955, including 207 colored persons, 234 Chinese, and 1,319 non-tribal Indians; in 1875, estimated by the governor at 36,000. Of the population in 1870, 18,931 were native and 5,024 foreign born, 14,990 males and 8,965 females. Of the natives, 6,932 were born in the territory, 1,673 in Oregon, 1,097 in New York, 967 in Illinois, 946 in Missouri, 866 in Ohio, 859 in Maine, 806 in Indiana, 749 in Iowa, 527 in Pennsylvania, 412 in California, and 402 in Kentucky. Of the foreigners, 2,190 were natives of the British isles, including 1,047 Irish, 1,121 of British America, and 645 of Germany. There were 3,332 males and 3,126 females between 5 and 18 years of age, 7,835 males from 18 to 45, and 9,241 males 21 years old and upward, of whom 7,902 were citizens of the United States and 1,339 unnaturalized foreigners. The number of families was 5,673, with an average of 4·22 persons to each; of dwellings, 6,066, with an average of 3·95 to each. Of persons 10 years old and upward (17,334), 1,018 could not read, and 1,307 could not write; 9,760 were returned as engaged in all occupations, of whom 3,771 were employed in agriculture, 2,207 in professional and personal services, 1,129 in trade and transportation, and 2,653 in manufactures and mining. Less than a third of the inhabitants are E. of the Cascade mountains, and these are mostly in Walla Walla and Columbia counties; a majority of those W. of that range are settled around Puget sound, and the rest chiefly on the Columbia. There are seven Indian agencies in the territory for the supervision of the tribal Indians, the names and location of which, with the size of reservations and number of Indians belonging to each agency, according to the report of the United States commissioner of Indian affairs for 1875, are as follows:

AGENCIES.	Reservations, acres.	Indians.
Colville, in the northeast	2,800,000	3,117
Neah Bay, on the coast	23,040	553
Quinaielt, on the coast	224,000	573
Nisqually, on Puget sound	32,200	1,329
Skokomish, on Puget sound	4,987	850
Tulalip, on Puget sound	49,281	3,250
Yakima, in the south	800,000	3,650
Total	3,933,508	13,322

These Indians are divided into about 40 small tribes.—The territory, in its topography, climate, and productions, strongly resembles Oregon. It is divided by the Cascade mountains into two portions, eastern Washington and western Washington, differing in their general features. The former contains about 50,000 sq. m., and the latter about 20,000. The Cascade mountains extend across the territory from Oregon to British Columbia. The highest peaks, proceeding from the north, are Mt. Baker (11,100 ft.), Mt. Ranier (14,444 ft.), Mt. St. Helen's (9,750 ft.), and Mt. Adams (9,570 ft.). In eastern Washington the surface is generally high, rolling, and irregular, with occasional plains. The Blue mountains extend from Oregon into the S. E. corner. The three principal divisions of western Washington are the Columbia basin, which back from the river bottoms is high and broken; the valley of the Chehalis river, embracing 2,000 sq. m., and varying in width from 15 to 50 m.; and the basin of Puget sound, embracing 12,000 sq. m. The Coast mountains, near the Pacific, attain prominence only in the northwest, between Puget sound and the ocean, culminating in Mt. Olympus, 8,138 ft. high. The territory has a coast line on the Pacific of about 180 m. The most noted headlands are Cape Disappointment or Hancock at the mouth of the Columbia and Cape Flattery at the entrance of the strait of Fuca. The principal indentations are Shoalwater bay, a little N. of the Columbia, and Gray's harbor, some miles further N.; they are not readily accessible by large vessels. The strait of Fuca extends E. for 80 m., and then divides into two channels, Rosario strait on the east and the canal de Haro on the west, which enclose the archipelago of Washington sound, and connect on the north with the gulf of Georgia. The chief islands of the archipelago are San Juan, Orcas, and Lopez. (See San Juan.) At the E. end of the strait of Fuca are Whidby and Camano islands. Bellingham bay opens into Rosario strait. Puget sound extends S. into the territory from the E. end of the strait of Fuca, 80 m. in a direct line, and abounds in excellent harbors. (See PUGET SOUND.) The principal harbors on the strait, proceeding W. from the sound, are Port Discovery, Squim bay or Washington harbor, New Dungeness bay, Port Angeles or False Dungeness, Clallam bay, and Neah bay. Puget sound and the strait of Fuca, with its connecting waters, furnish a coast line of several hundred miles. The chief river is the Columbia, which drains the whole of eastern Washington. It enters the territory from British Columbia, and pursues an irregular course to the Oregon border, whence it flows W. into the Pacific, forming the boundary between Oregon and Washington for about 300 m. It is navigable throughout the territory, with occasional interruptions from rapids. (See COLUMBIA RIVER.) Its chief tributaries from the east are Clarke's fork, which crosses the N. E. corner of the territory from Idaho, the Colville, the Spokane, the Snake, and the Walla Walla, which empties into the main stream near the Oregon border. The Snake flows N., forming the S. portion of the Idaho boundary for 30 m., and then entering Washington flows W. 150 m. to the Columbia. It is navigable to the Idaho border. Its chief tributaries in Washington are the Palouse from the north, and from the south the Tukanon and the Grande Ronde, which crosses the S. E. corner from Oregon. On the west the Columbia receives the Nehoialpitkwu, Okinakane, Methow, Chelan, Wenachee, and Yakima. On the north the chief tributaries are the Klikitat and White Salmon E. of the Cascade mountains, and the Washougal, Cathlapootle, Lewis, and Cowlitz W. of them. The Cowlitz is 100 m. long, and is navigable by steamers for 24 m. The principal streams that reach the Pacific coast, besides the Columbia, are the Willopah, emptying into Shoalwater bay; the Chehalis, into Gray's harbor, after a course of 80 m., three fourths of which is navigable by steamers; and the Quinaielt and Quillehute, further N. The Skokomish empties into the head of Hood's canal, the W. branch of Puget sound. The Des Chutes river flows into the S. extremity of the sound, which as we proceed N. receives on the east the Nisqually (80 m. long), Pugallup, Duwamish (navigable for 30 m.), and Snohomish or Snoqualmie, 40 m. from the mouth of which occurs a fall of 270 ft.; light-draught steamers ascend nearly to the fall. N. of the Snohomish are the Stilagahmish, Skagit (100 m. long), and the Nooksahk or Lummi, which empties into the N. end of Bellingham bay. The principal lakes in western Washington, none of them large, are Washington and Union near Seattle, American near Steilacoom, and Whatcom in Whatcom co. In eastern Washington Lake Chelan is the largest body of water.—The principal geological formations in western Washington are the Cambrian and Silurian, eozoic, cretaceous, and tertiary. The N. E. corner is of eozoic and tertiary age. The central and S. E. portions, comprising the greater part of the basin of the Columbia, are volcanic. Anthracite and bituminous coal is found in various parts of western Washington, and mines are worked near Bellingham bay and Lake Washington, which yield bituminous coal, and ship an average of 500 tons per day. At the head of the south fork of the Yakima river occurs a conglomerate containing gold in small proportion. The bars of the Columbia and its tributaries above Priest rapids, and particularly in the neighborhood of Fort Colville in the N. E. part of the territory, have been profitably worked for short periods. The total yield of gold to 1868, according to J. Ross Browne's "Resources of the Pacific Slope," was $10,000,000; but this estimate is believed to be much too large. Since that date the yield has steadily declined, the average product having been less than $300,000 per annum, and the product in 1875 only about $82,000.—The climate of western Washington is equable; in eastern Washington it is subject to greater extremes. In western Washington the year may be divided into the wet and dry seasons. The former lasts from November to March or April, during which period drizzly weather prevails; the latter, covering the rest of the year, is not absolutely dry, showers being not unfrequent. The mean temperature of western Washington, derived from observations taken near Steilacoom (lat. 47° 10′) for four years, is as follows: year, 50·8°; spring, 49°; summer, 63·3°; autumn, 51·9°; winter, 39°; coldest month (January), 38·1°; warmest month (July), 64·9°. The average precipitation of rain and melted snow in the same vicinity, derived from observations for six years, is as follows: spring, 11·19 inches; summer, 3·85; autumn, 15·83; winter, 22·62; year, 53·49. The least rain fell in July (0·34 inch), and the most in December (9·92). Immediately along the Pacific coast the rainfall is much greater. The thermometer occasionally reaches 90° in summer, but the nights are always cool. Snow rarely falls to a great depth, and lasts but a short time; but little ice is formed. Grass remains green nearly the entire year, and flowers are often found in bloom in midwinter. The climate of eastern Washington is much drier, the average annual rainfall in the Walla Walla valley being only 18 inches. The mean temperature here is as follows; spring, 52°; summer, 73°; autumn, 53°; winter, 34°; year, 53°. Further N. toward the British boundary the winters are several degrees colder. The country is healthful.—Western Washington is for the most part densely wooded. There are some prairie tracts. The soil is generally fertile, and in parts very rich. In eastern Washington timber occurs only on the mountain slopes, which are covered with evergreens, and in the valleys of the streams, where some cottonwood, alder, pine, and cedar are found. In the Yakima, Colville, Palouse, and Walla Walla valleys there is much land adapted to cultivation, and more suited to grazing, cattle flourishing on the bunch grass throughout the year. Large tracts in eastern Washington might be rendered productive by irrigation. The most useful trees of western Washington are coniferæ, the principal varieties being the red and black fir (*abies Douglasii*), often attaining a great size and valuable for lumber; the yellow fir (*A. grandis*), reaching a height of 300 ft. and much used for masts and spars; the black spruce (*A. Menziesii*), also used for masts and spars; the Oregon cedar (*thuja gigantea*), extensively used for rails and shingles; the Oregon yew (*taxus brevifolia*), the yellow pine (*pinus ponderosa*), the twisted or scrub pine (*P. contorta*), white pine, white spruce, and hemlock spruce. The chief agricultural productions are wheat, barley, oats, rye, potatoes, turnips and other vegetables, apples, pears, plums, cherries, cranberries, &c. In portions of eastern Washington Indian corn and peaches will grow. Among the indigenous animals are the black bear, cougar, wild cat, wolf, elk, deer, mountain goat, beaver, otter, fox, raccoon, and hare. Hawks, eagles, owls, cranes, plover, grouse, swans, geese, ducks, gulls, humming birds, robins, and blackbirds are common. The waters of the territory swarm with fish, of which the principal varieties are the salmon, cod, halibut, herring, and sturgeon, and with lobsters, oysters, and clams. Whales and seals are also found off the coast.—The number of acres of land in farms, according to the census of 1870, was 649,139, of which 192,016 were improved; number of farms, 3,127, of which 889 contained less than 10 acres each, 415 from 10 to 20, 772 from 20 to 50, 424 from 50 to 100, 575 from 100 to 500, 40 from 500 to 1,000, and 12 more than 1,000; cash value of farms, $3,978,341; of farming implements and machinery, $280,551; amount of wages paid during the year, including value of board, $215,522; estimated value of all farm productions, including betterments and additions to stock, $2,111,902; value of orchard products, $71,863; of produce of market gardens, $74,462; of forest products, $19,705; of home manufactures, $28,890; of animals slaughtered or sold for slaughter, $292,280; of all live stock, $2,103,343. The productions were 186,180 bushels of spring wheat, 30,863 of winter wheat, 4,453 of rye, 21,781 of Indian corn, 255,169 of oats, 55,787 of barley, 316 of buckwheat, 15,790 of peas and beans, 280,719 of Irish potatoes, 425 of sweet potatoes, 179 of clover seed, 1,387 of grass seed, 1,682 lbs. of tobacco, 162,713 of wool, 407,306 of butter, 17,465 of cheese, 6,162 of hops, 629 of wax, 25,636 of honey, 612 gallons of sorghum molasses, 235 of wine, and 30,233 tons of hay. The live stock on farms consisted of 11,138 horses, 943 mules and asses, 16,938 milch cows, 2,181 working oxen, 28,135 other cattle, 44,063 sheep, and 17,491 swine; besides which there were 2,785 horses and 4,725 neat cattle not on farms. The number of manufacturing establishments was 269, having 38 steam engines of 1,411 horse power, and 52 water wheels of 1,412 horse power; number of hands employed, 1,026; amount of capital invested, $1,893,674; wages paid during the year, $574,936; value of material used, $1,435,128; of products, $2,851,052. The most important establishments were 46 saw mills, value of products $1,307,585; 7 planing mills, $616,100; and 20 flouring and grist mills, $321,103. The production of lumber is the most important industry in the territory. The product in 1870 consisted of 128,743,000 feet of lumber, 17,000,000 laths, and 10,450,000 shingles. The quantity of all kinds of lumber produced in 1875 is estimated at 250,000,000 feet, valued at about $3,000,000.—The territory constitutes one customs district, that of Puget Sound, of which Port Townsend is the port of entry. The value of imports from foreign countries for the year ending July 31, 1875, was $49,125; of exports to foreign countries, $759,230, including 33,907,000 feet of assorted lumber, valued at $352,510, and live stock, grain, provisions, &c., valued at $406,720. The number of entrances was 315, with an aggregate tonnage of 117,062; clearances, 348, tonnage 134,506. The entrances in the coastwise trade were 132, tonnage 75,215; clearances, 51, tonnage 22,123. There were 18 vessels built, of an aggregate tonnage of 3,986; number of vessels owned in the district, 108, tonnage 26,548. Including domestic commerce, which is carried on chiefly with San Francisco, the total value of exports for the year is estimated at $5,000,000. The fisheries are of considerable importance; their value according to the census of 1870 was $289,746. The product consisted of 1,000 quintals of cod, 70,000 bushels of oysters, 2,143 barrels of salmon, and 1,810,000 lbs. of canned salmon. The salmon fishery, the most valuable, is carried on chiefly in the Columbia river near its mouth. Oysters are shipped from Shoalwater bay to Portland, Or., and San Francisco. There are two railroads in the territory, the Pacific division of the Northern Pacific and the Walla Walla and Columbia (narrow gauge). The former extends from Kalama on the Columbia river to Tacoma on Puget sound, 105 m., and is designed to form part of the transcontinental line now completed W. to the Missouri river in Dakota. The latter extends from Walla Walla to Wallula on the Columbia river, 32 m.—The executive officers are a governor and secretary, appointed by the president with the consent of the senate for four years, and an auditor and treasurer, appointed by the governor and council for two years. The legislature consists of a council of 9 members and a house of representatives of 30 members, both elected by the qualified voters for two years. The judicial power is vested in a supreme court, three district courts, a probate court in each county, and justices of the peace. The supreme court has appellate jurisdiction, and consists of a chief justice and two associates, appointed by the president with the consent of the senate for four years. The district courts have general original jurisdiction, and are held by a single judge of the supreme court. The probate judges are elected by the people of the respective counties for two years. The valuation of property in 1860 and 1870, according to the federal census, was as follows:

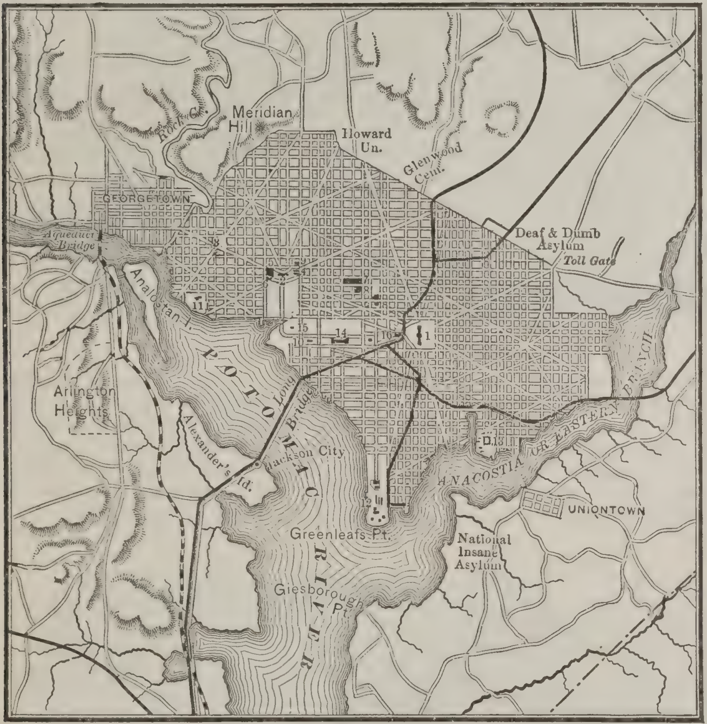
YEARS.	ASSESSED VALUE.			True value of real and personal estate.
	Real estate.	Personal estate.	Total.	
1860.....	$1,876,063	$2,518,672	$4,394,735	$5,601,466
1870.....	5,146,776	5,496,087	10,642,863	13,562,164

The total taxation in 1870 was $163,992, of which $33,743 was territorial, $119,291 county, and $10,955 town, city, &c.; public debt, $88,827, of which $71,196 was county and $17,631 town, city, &c. The assessed value of property in 1875 was $14,569,156; territorial tax levied, $58,295 33. The balance in the treasury on Sept. 30, 1873, was $3,805 25; receipts during the two following years, $87,936 06; disbursements, $79,398 60; balance, Oct. 1, 1875, $12,342 71. The territorial debt on that date amounted to $20,599 99. There is a territorial insane asylum at Steilacoom. A penitentiary has been erected by the United States on McNeil's island in Puget sound, near Steilacoom.—The public schools are under the general supervision of a superintendent of common schools, appointed by the governor and council for two years. A county superintendent is elected biennially in each county, and one director is elected annually in each school district for a term of three years. The schools are supported by taxation, fines under criminal statutes, and private contributions. In 1875 there were 305 districts; schools taught, 238; persons of school age (4 to 21), 11,291; number attending school, 7,566; teachers, 240; amount paid teachers, $48,358; school revenue, $51,556. The territorial university at Seattle has a preparatory department in operation. Holy Angels' college (Roman Catholic) is at Vancouver. According to the census of 1870, there were 102 libraries, containing 33,362 volumes, of which 72, with 19,810 volumes, were private. The number of newspapers was 14, issuing 396,500 copies annually and having a circulation of 6,785, viz.: 1 daily, 1 tri-weekly, 10 weekly, and 2 monthly. There were 47 religious organizations, with 36 church edifices, 6,000 sittings, and property to the value of $62,450. Of the organizations, 3 were Baptist, 4 Christian, 2 Congregational, 4 Episcopal, 16 Methodist, 3 Presbyterian, 11 Roman Catholic, 1 Second Advent, and 3 United Brethren in Christ.—Washington originally formed part of Oregon. It was erected into a territory by the act of March 2, 1853, comprising the region lying between the Pacific ocean and the summit of the Rocky mountains, and N. of the Columbia river and the 46th parallel. The act of Feb. 14, 1859, for the admission of Oregon into the Union, added to Washington the region between the E. boundary of that state and the Rocky mountains, and N. of the 42d parallel. The territory then comprised 193,071 sq. m., embracing the present territory of Idaho and parts of Montana and Wyoming. The first American settlement was made at Tumwater in 1845 by a few families, who had crossed the plains. Previously the only white inhabitants were employees of the Hudson Bay company. The islands in Washington sound, formerly claimed by Great Britain, were decided in 1872 by the arbitration of the emperor of Germany to belong to the United States, and in 1873 were formed into a county. (See supplement.)

WASHINGTON, the name of 28 counties in the United States. **I.** The extreme S. E. county of Maine, separated from New Brunswick by the St. Croix river, bounded S. by the Atlantic ocean, and drained by the Schoodic and Machias rivers; area, about 2,700 sq. m.; pop. in 1870, 43,343. The surface is undulating and the soil in the interior fertile. There are numerous lakes, the principal of which are the Schoodic, Big, Bascahegan, and Grand. The coast line is nearly 80 m. long, indented with numerous bays and inlets, which afford excellent harbors. Passamaquoddy bay is on the S. E. border. The county is traversed by the European and North American, the St. Croix and Penobscot, and the Whitneyville and Machiasport railroads. The chief productions in 1870 were 2,029 bushels of wheat, 35,997 of oats, 12,427 of barley, 11,102 of buckwheat, 237,102 of potatoes, 526,913 lbs. of butter, 47,072 of wool, and 30,120 tons of hay. There were 2,139 horses, 15,341 milch cows, 6,148 other cattle, 15,211 sheep, and 1,431 swine. There were 327 manufactories; capital invested, $2,277,920; value of products, $4,273,067. The chief establishments were 10 manufactories of carriages and wagons, 9 of cooperage, 22 of cured fish, 5 of iron, 3 of machinery, 1 of ground plaster, 6 of sails, 24 ship yards, 63 saw mills, 4 tanneries, and 4 flour mills. Capital, Machias. **II.** A N. central county of Vermont, drained by Onion river and its tributaries; area, 580 sq. m.; pop. in 1870, 26,520. The surface is very much broken, and in some parts mountainous. Most of the county lies between the E. and W. ranges of the Green mountains. It is intersected by the Vermont Central railroad. The chief productions in 1870 were 3,730 bushels of wheat, 127,480 of Indian corn, 395,424 of oats, 30,988 of buckwheat, 393,841 of potatoes, 2,218,224 lbs. of butter, 92,547 of cheese, 121,195 of wool, 1,109,678 of maple sugar, and 83,961 tons of hay. There were 5,564 horses, 17,154 milch cows, 12,359 other cattle, 26,169 sheep, and 3,428 swine; 3 manufactories of agricultural implements, 3 of boots and shoes, 14 of carriages and wagons, 3 of iron castings, 6 of machinery, 12 of saddlery and harness, 2 of washing machines, &c., 5 of woollens, 29 saw mills, 6 tanneries, 3 currying establishments, and 2 flour mills. Capital, Montpelier, which is also the capital of the state. **III.** A S. county of Rhode Island, bordering on Connecticut, bounded E. by Narragansett bay and S. by the Atlantic ocean, and drained by Charles river and its tributaries; area, 367 sq. m.; pop. in 1870, 20,097; in 1875, 20,061. The surface is uneven and the soil fertile and well adapted to pasturage. It is intersected by the Stonington and Providence railroad. The chief productions in 1870 were 2,087 bushels of wheat, 88,640 of Indian corn, 53,755 of oats, 118,017 of potatoes, 248,354 lbs. of butter, 21,242 of cheese, 29,183 of wool, and 20,425 tons of hay. There were 1,541 horses, 4,047 milch cows, 4,465 other cattle, 9,359 sheep, and 2,731 swine. There were 121 manufacturing establishments; capital invested, $3,120,580; value of products, $6,083,320. The principal establishments were 7 manufactories of carriages and wagons, 1 of iron castings, 3 of marble and stone work, 1 of drugs and chemicals, 1 of engines and boilers, 26 of cotton goods, 33 of woollen goods, and 5 saw mills. Capital, Kingston. **IV.** An E. county of New York, bordering on Vermont, from which it is in part separated by Lake Champlain, and bounded W. partly by the Hudson river and Lake George; area, 850 sq. m.; pop. in 1870, 49,568; in 1875, 48,167. The surface is mountainous in the north and moderately hilly in the south, and the soil in some parts is fertile. Iron ore, slate, marble, water limestone, marl, lead, and copper are found. It is traversed by the Champlain canal and the Rensselaer and Saratoga railroad. The chief productions in 1870 were 24,091 bushels of wheat, 105,932 of rye, 384,702 of Indian corn, 761,489 of oats, 58,479 of buckwheat, 2,141,464 of potatoes, 1,606,457 lbs. of butter, 225,002 of cheese, 507,183 of wool, 1,285,033 of flax, and 118,257 tons of hay. There were 10,222 horses, 18,352 milch cows, 14,144 other cattle, 102,045 sheep, and 9,301 swine. There were 427 manufactories; capital invested, $3,561,980; value of products, $5,028,391. The chief establishments were 4 manufactories of agricultural implements, 35 of carriages and wagons, 6 of cheese, 7 of dressed flax, 1 of gunpowder, 1 of hosiery, 1 of pig iron, 6 of iron castings, 6 of lime, 7 of machinery, 5 of marble and stone work, 8 of paper, 2 of stone and earthen ware, 8 of woollen goods, 6 planing mills, 22 saw mills, 11 tanneries, 9 currying establishments, and 11 flour mills. Capitals, Salem and Sandy Hill. **V.** A S. W. county of Pennsylvania, bounded W. by West Virginia and E. by the Monongahela river, and traversed by several railroads; area, 888 sq. m.; pop. in 1870, 48,483. It has a hilly surface, and a rich limestone soil in the hilly portions, and a deep black loam in the bottoms. Great attention has been paid to wool growing, and the sheep of this county are of the best quality. Bituminous coal and limestone are very abundant, and iron ore is found. The chief productions in 1870 were 451,828 bushels of wheat, 27,243 of rye, 1,467,904 of Indian corn, 1,062,408 of oats, 128,367 of barley, 187,516 of potatoes, 1,178,306 lbs. of butter, 1,862,752 of wool, and 67,595 tons of hay. There were 12,421 horses, 12,280 milch cows, 16,604 other cattle, 482,708 sheep, and 26,274 swine; 26 manufactories of carriages and wagons, 11 of furniture, 1 of printing paper, 6 of boats, 18 of saddlery and harnesses, 6 of woollens, 6 planing mills, 12 saw mills, 10 distilleries, 8 tanneries, and 11 flour mills. Capital, Washington. **VI.** A N. W. county of Maryland, bordering on Pennsylvania, separated from Virginia by the Potomac, and intersected by Antietam, Conecocheague, and Licking creeks; area, 818 sq. m.; pop. in 1870, 34,712, of whom 2,838 were colored. The surface is very hilly, and the South mountain, a continuation of the Blue Ridge, extends along the E. border. Iron ore, bituminous coal, and limestone are found. It is traversed by the Chesapeake and Ohio canal, and by the Cumberland Valley and Western Maryland railroads and the Washington County division of the Baltimore and Ohio railroad. The chief productions in 1870 were 930,246 bushels of wheat, 28,394 of rye, 737,989 of Indian corn, 142,886 of oats, 90,885 of potatoes, 393,070 lbs. of butter, 48,284 of wool, and 29,281 tons of hay. There were 8,423 horses, 6,310 milch cows, 10,023 other cattle, 9,268 sheep, and 20,212 swine; 5 manufactories of agricultural implements, 11 of carriages and wagons, 1 of cement, 15 of furniture, 2 of pig iron, 4 of iron castings, 1 of printing paper, 16 of tin, copper, and sheet-iron ware, 6 saw mills, 3 distilleries, 10 tanneries, 8 currying establishments, and 41 flour mills. Capital, Hagerstown. **VII.** A S. W. county of Virginia, bordering on Tennessee, and intersected by the North and South forks of Holston river; area, 520 sq. m.; pop. in 1870, 16,816, of whom 2,653 were colored. It is traversed by the Iron mountain in the S. E., and Clinch mountain forms the N. W. boundary. The surface is mountainous or hilly, and the soil generally fertile. Iron, bituminous coal, gypsum, and limestone are abundant, and there are valuable salt wells, yielding large quantities for exportation. The Atlantic, Mississippi, and Ohio railroad passes through it. The chief productions in 1870 were 106,521 bushels of wheat, 10,863 of rye, 351,732 of Indian corn, 183,147 of oats, 11,383 of potatoes, 187,010 lbs. of butter, 28,936 of wool, 27,864 of tobacco, and 5,008 tons of hay. There were 4,292 horses, 4,404 milch cows, 6,012 other cattle, 13,308 sheep, and 14,733 swine; 13 manufactories of carriages and wagons, 13 of furniture, 2 of ground plaster, 7 wool-carding and cloth-dressing establishments, 2 pork-packing establishments, 11 tanneries, and 9 saw mills. Capital, Abingdon. **VIII.** An E. county of North Carolina, bordering on Albemarle sound; area, 360 sq. m.; pop. in 1870, 6,516, of whom 2,777 were colored. The surface is level and mostly covered with swamps, which abound in valuable cypress and red cedar timber. Pongo and Scuppernong lakes are on the S. E. border. The chief productions in 1870 were 2,413 bushels of wheat, 152,038 of Indian corn, 28,309 of sweet potatoes, 13,256 lbs. of rice, and 1,087 bales of cotton. There were 483 horses, 941 milch cows, 1,880 other cattle, 1,606 sheep, and 6,213 swine. Capital, Plymouth. **IX.** An E. county of Georgia, bounded S. W. by the Oconee river, and N. E. partly by the Ogeechee; area, 760 sq. m.; pop. in 1870, 15,842, of whom 8,312 were colored. It has a diversified surface and a fertile soil. Limestone and buhrstone abound. Near the county seat are several extensive caves in which have been found a great variety of fossils, the remains of mammoth animals, while opal, jasper, agate, and chalcedony have been found in the vicinity. It is intersected by the Georgia Central railroad. The chief productions in 1870 were 11,557 bushels of wheat, 15,822 of rye, 313,487 of Indian corn, 43,590 of sweet potatoes, 36,152 lbs. of butter, 8,024 of wool, and 11,338 bales of cotton. There were 1,485 horses, 1,427 mules and asses, 2,704 milch cows, 6,923 other cattle, 4,557 sheep, and 21,633 swine. Capital, Sandersville. **X.** A W. county of Florida, bordering on the gulf of Mexico, and bounded N. and W. by Choctawhatchee bay and river; area, 1,100 sq. m.; pop. in 1870, 2,302, of whom 373 were colored. St. Andrew's bay on the S. border forms an excellent harbor. The surface is undulating, and the soil fertile in the interior and poor on the coast. Live oak is abundant, and forms an important article of export. The chief productions in 1870 were 34,900 bushels of Indian corn, 13,061 of sweet potatoes, 7,590 lbs. of tobacco, and 107 bales of cotton. There were 145 horses, 1,321 milch cows, 3,977 other cattle, 799 sheep, and 4,087 swine. Capital, Vernon. **XI.** A S. W. county of Alabama, bordering on Mississippi and bounded E. by the Tombigbee river; area, 940 sq. m.; pop. in 1870, 3,912, of whom 1,787 were colored. The surface is uneven and the soil sandy and moderately fertile. The Mobile and Ohio railroad crosses the S. W. part. The chief productions in 1870 were 57,034 bushels of Indian corn, 14,260 of sweet potatoes, 5,103 lbs. of wool, 4,500 of rice, and 1,803 bales of cotton. There were 403 horses, 2,626 milch cows, 4,750 other cattle, 2,389 sheep, and 5,024 swine. Capital, Saint Stephens. **XII.** A W. county of Mississippi, separated from Arkansas by the Mississippi river, bounded E. partly by the Yazoo, and intersected by the Sunflower, Steele bayou, and Deer creek; area, 1,220 sq. m.; pop. in 1870, 14,569, of whom 12,405 were colored. The surface is level, liable to inundations, and interspersed with small lakes and ponds, and the soil is highly fertile. The chief productions in 1870 were 2,700 bushels of wheat, 248,991 of Indian corn, 105,325 of oats, 5,132 of sweet potatoes, and 35,902 bales of cotton. There were 1,240 horses, 3,716 mules and asses, 2,101 milch cows, 6,295 other cattle, 1,089 sheep, and 9,175 swine. Capital, Greenville. **XIII.** A S. E. parish of Louisiana, bounded N. and E. by Mississippi, from which it is separated by Pearl river, and intersected by Bogue Chitto creek; area, about 700 sq. m.; pop. in 1870, 3,330, of whom 939 were colored; in 1875, 3,769, of whom 983 were colored. The surface is generally undulating, and the soil sandy and moderately fertile. The chief productions in 1870 were 33,729 bushels of Indian corn, 14,903 of sweet potatoes, 12,807 lbs. of rice, 5,173 of wool, and 533 bales of cotton. There were 618 horses, 1,448 milch cows, 2,678 other cattle, 2,732 sheep, and 5,772 swine. Capital, Franklinton. **XIV.** A S. E. county of Texas, bounded N. by Yegua creek, and E. by the Brazos river; area, 726 sq. m.; pop. in 1870, 23,104, of whom 12,241 were colored. The surface is undulating and the soil generally a deep and fertile loam. Live oak and red cedar are abundant. The Houston and Texas Central railroad traverses it. The chief productions in 1870 were 663,252 bushels of Indian corn, 11,814 of Irish and 59,192 of sweet potatoes, 157,237 lbs. of butter, 12,044 of wool, 22,452 bales of cotton, and 1,023 tons of hay. There were 7,313 horses, 2,182 mules and asses, 10,944 milch cows, 33,788 other cattle, 8,264 sheep, and 23,150 swine. Capital, Brenham. **XV.** A N. W. county of Arkansas, bordering on the Indian territory, and drained by the head streams of White and Illinois rivers; area, 870 sq. m.; pop. in 1870, 17,266, of whom 674 were colored. The surface is diversified, and the soil fertile. The chief productions in 1870 were 156,621 bushels of wheat, 580,687 of Indian corn, 71,938 of oats, 40,229 of Irish and 18,562 of sweet potatoes, 156,648 lbs. of butter, 14,876 of wool, and 116,176 of tobacco. There were 4,667 horses, 1,130 mules and asses, 4,153 milch cows, 5,912 other cattle, 7,597 sheep, and 33,431 swine. Capital, Fayetteville. **XVI.** A N. E. county of Tennessee, bounded N. E. by the Watauga river, intersected by the Nolichucky, and separated from North Carolina by Bald mountain; area, about 430 sq. m.; pop. in 1870, 16,317, of whom 1,614 were colored. The surface is diversified by mountains and valleys, and the soil of the latter is highly fertile. Iron ore is abundant, and bituminous coal is found. It is traversed by the East Tennessee, Virginia, and Georgia railroad. The chief productions in 1870 were 170,934 bushels of wheat, 290,388 of Indian corn, 148,383 of oats, 8,488 of Irish and 3,656 of sweet potatoes, 167,677 lbs. of butter, 2,694 of wool, 22,806 of tobacco, and 5,669 tons of hay. There were 3,620 horses, 3,604 milch cows, 5,310 other cattle, 13,208 sheep, and 15,335 swine; 1 pig iron establishment, 19 flour mills, and 3 saw mills. Capital, Jonesborough. **XVII.** A central county of Kentucky, bounded N. W. by Lick creek; area, about 550 sq. m.; pop. in 1870, 12,464, of whom 2,110 were colored. It has an undulating surface and a fertile soil resting on a limestone formation. The chief productions in 1870 were 115,901 bushels of wheat, 40,437 of rye, 643,588 of Indian corn, 84,742 of oats, 22,405 of potatoes, 150,997 lbs. of butter, 31,944 of wool, 34,975 of tobacco, and 2,201 tons of hay. There were 5,087 horses, 1,816 mules and asses, 3,108 milch cows, 5,968 other cattle, 10,635 sheep, and 27,733 swine; 2 flour mills, and 5 saw mills. Capital, Springfield. **XVIII.** A S. E. county of Ohio, separated from West Virginia by the Ohio river, and intersected by the Muskingum; area, 713 sq. m.; pop. in 1870, 40,609. It has a diversified surface and a very fertile soil. Iron ore is found, and bituminous coal is very abundant. It is traversed by the Marietta and Cincinnati and Marietta and Pittsburgh railroads. The chief productions in 1870 were 206,549 bushels of wheat, 675,616 of Indian corn, 245,414 of oats, 216,297 of potatoes, 702,606 lbs. of butter, 236,230 of wool, 1,041,125 of tobacco, and 26,431 tons of hay. There were 7,047 horses, 7,669 milch cows, 11,176 other cattle, 61,764 sheep, and 17,533 swine; 4 manufactories of boots and shoes, 5 of furniture, 1 of hubs and wagon material, 1 of rectified coal oil, 32 of cooperage, 4 of iron, 4 of woollens, 1 planing mill, 8 saw mills, 6 tanneries, 6 currying establishments, and 10 flour mills. Capital, Marietta. **XIX.** A S. county of Indiana, bounded N. by the Muscatatock river, and drained by the Lost and Great Blue; area, 510 sq. m.; pop. in 1870, 18,495. The "Knobs" range of hills are in the E. part. The surface is mostly undulating, and the soil very fertile, resting upon a limestone and sandstone formation. Lost river flows for a considerable distance under ground. The Louisville, New Albany, and Chicago railroad passes through the county. The chief productions in 1870 were 213,378 bushels of wheat, 681,399 of Indian corn, 252,229 of oats, 33,803 of potatoes, 320,309 lbs. of butter, 48,386 of wool, 30,230 of tobacco, and 8,546 tons of hay. There were 6,378 horses, 1,125 mules and asses, 5,235 milch cows, 8,766 other cattle, 18,290 sheep, and 29,176 swine; 4 manufactories of carriages and wagons, 8 of furniture, 11 tanneries, 7 currying establishments, 11 saw mills, 15 flour mills, and 1 woollen mill. Capital, Salem. **XX.** A S. W. county of Illinois, drained by the Kaskaskia river and Elkhorn, Beaucoup, and Muddy creeks; area, 580 sq. m.; pop. in 1870, 17,599. The surface is level and finely diversified with prairie and woodland, and the soil is in parts very fertile. It is traversed by the Illinois Central and the St. Louis and Southeastern railroads. The chief productions in 1870 were 672,486 bushels of wheat, 836,115 of Indian corn, 533,398 of oats, 64,592 of potatoes, 251,529 lbs. of butter, 22,136 of wool, and 12,491 tons of hay. There were 6,220 horses, 1,333 mules and asses, 3,798 milch cows, 4,812 other cattle, 8,037 sheep, and 20,563 swine; 6 manufactories of agricultural implements, 13 of carriages and wagons, 14 flour mills, 1 woollen mill, and 3 saw mills. Capital, Nashville. **XXI.** A S. E. county of Wisconsin, drained by the Milwaukee river and other streams; area, 432 sq. m.; pop. in 1870, 23,919; in 1875, 23,862. There are two or three small lakes. The surface is mostly level, and the soil very fertile. Excellent limestone for building abounds, and iron is found in some parts. The Milwaukee and St. Paul railroad passes through it. The chief productions in 1870 were 716,687 bushels of wheat, 75,767 of rye, 216,382 of Indian corn, 393,543 of oats, 64,303 of barley, 192,995 of potatoes, 632,214 lbs. of butter, 57,456 of wool, and 23,025 tons of hay. There were 6,700 horses, 8,459 milch cows, 7,813 other cattle, 16,808 sheep, and 12,773 swine; 1 manufactory of agricultural implements, 18 of carriages and wagons, 6 of furniture, 13 of saddlery and harness, 9 flour mills, and 12 saw mills. Capital, West Bend. **XXII.** An E. county of Minnesota, separated from Wisconsin by the St. Croix river, and bounded S. by the Mississippi; area, 380 sq. m.; pop. in 1870, 11,809; in 1875, 14,751. It has a diversified surface and a fertile soil. There are numerous small lakes. It is traversed by the Lake Superior and Mississippi, the North Wisconsin, and the West Wisconsin railroads. The chief productions in 1870 were 444,411 bushels of wheat, 113,650 of Indian corn, 267,086 of oats, 42,155 of barley, 45,686 of potatoes, 118,392 lbs. of butter, 6,806 of wool, and 6,430 tons of hay. There were 1,699 horses, 2,074 milch cows, 2,090 other cattle, 2,179 sheep, and 2,870 swine; 4 manufactories of cooperage, 4 breweries, 4 flour mills, and 11 saw mills. Capital, Stillwater. **XXIII.** A S.E. county of Iowa, drained by the Iowa, Skunk, and English rivers; area, 556 sq. m.; pop. in 1870, 18,952. It has a level surface, diversified by prairie and woodland, and the soil is generally very fertile. It is partly traversed by the Chicago, Rock Island, and Pacific railroad. The chief productions in 1870 were 333,053 bushels of wheat, 1,028,564 of Indian corn, 268,027 of oats, 67,167 of potatoes, 457,010 lbs. of butter, 20,879 of cheese, 66,864 of wool, and 31,246 tons of hay. There were 8,653 horses, 7,165 milch cows, 14,518 other cattle, 19,618 sheep, and 30,886 swine; 2 manufactories of agricultural implements, 4 of furniture, 2 of iron castings, 7 flour mills, 4 saw mills, and 3 woollen mills. Capital, Washington. **XXIV.** An E. county of Nebraska, separated from Iowa by the Missouri river, and bounded S. W. by the Elkhorn; area, about 400 sq. m.; pop. in 1870, 4,452; in 1875, 6,114. The surface is undulating and the soil fertile. Timber is found along the streams. The Omaha and Northwestern and the Sioux City and Pacific railroads traverse it. The chief productions in 1870 were 164,611 bushels of wheat, 203,695 of Indian corn, 108,971 of oats, 40,617 of potatoes, 4,758 lbs. of wool, 97,032 of butter, and 8,078 tons of hay. There were 1,431 horses, 1,289 milch cows, 2,107 other cattle, 1,478 sheep, and 2,508 swine; 3 flour mills, and 3 saw mills. Capital, Blair. **XXV.** A S. E. county of Missouri, bounded N. E. partly by Big river and N. W. partly by the Maramec; area, 870 sq. m.; pop. in 1870, 11,719, of whom 971 were colored. The surface is generally very hilly, and the soil moderately fertile. The county is celebrated for its mineral wealth. Iron mountain near the S. E. border is a huge mass of magnetic iron ore, and lead mines are very numerous near the county seat. Silver, copper, plumbago, copperas, chalk, and limestone are also found in considerable quantities. The county is intersected by the St. Louis and Iron Mountain railroad. The chief productions in 1870 were 38,627 bushels of wheat, 261,633 of Indian corn, 86,809 of oats, 20,398 of potatoes, 69,709 lbs. of butter, 14,684 of wool, and 2,378 tons of hay. There were 2,573 horses, 2,626 milch cows, 4,447 other cattle, 7,830 sheep, and 16,036 swine; 7 flour mills, 13 saw mills, 1 blast furnace, and 15 lead furnaces. Capital, Potosi. **XXVI.** A N. E. county of Kansas, bordering on Nebraska, and watered by the Little Blue river and other streams; area, 900 sq. m.; pop. in 1870, 4,081; in 1875, 8,622. The surface is rolling, and consists of prairies, with well timbered river bottoms; the soil is moderately fertile. The chief productions in 1870 were 51,176 bushels of wheat, 123,124 of Indian corn, 18,484 of oats, 16,109 of potatoes, 53,182 lbs. of butter, and 5,284 tons of hay. There were 735 horses, 837 milch cows, 1,562 other cattle, 452 sheep, and 761 swine. Capital, Washington. **XXVII.** A N. W. county of Oregon, bounded E. by the Willamette river, bordering W. on the Coast mountains, and watered by Tualatin river, which is navigable for some distance, and other streams; area, 750 sq. m.; pop. in 1870, 4,261; in 1875, 4,963. The surface is diversified with prairies and groves of timber, and the soil is fertile. Iron ore is abundant. It is traversed by the Oregon Central railroad. The chief productions in 1870 were 157,187 bushels of wheat, 183,151 of oats, 4,724 of barley, 23,915 of potatoes, 29,920 lbs. of wool, 72,118 of butter, and 5,409 tons of hay. There were 1,718 horses, 1,503 milch cows, 1,880 other cattle, 6,135 sheep, and 6,177 swine. Capital, Hillsborough. **XXVIII.** The S. W. county of Utah, bordering on Arizona and Nevada, and watered by the Rio Virgin and Santa Clara rivers; area, 1,890 sq. m.; pop. in 1870, 3,064. The Wahsatch mountains are on the north. There is considerable productive soil in the valleys of the streams. Cotton has been produced. The chief productions in 1870 were 4,842 bushels of wheat, 5,769 of Indian corn, 10,209 of potatoes, and 5,345 lbs. of wool. There were 739 horses, 1,193 milch cows, 2,007 other cattle, 3,170 sheep, and 152 swine; 4 saw mills, and 1 quartz mill. Capital, St. George.

WASHINGTON, the capital of the United States of America, in the District of Columbia, on the left or N. E. bank of the Potomac river, 116½ m. above its mouth at Smith's point, and 184½ m. from the Atlantic at the mouth of Chesapeake bay, between the Anacostia or Eastern branch and Rock creek (which separates it from Georgetown on the west), 35 m. (direct) S. W. of Baltimore, and 205 m. S. W. of New York; lat. (capitol) 38° 53′ 20·1″ N., lon. 77° 0′ 27·9″ W. of Greenwich; pop. in 1800, 3,210; 1810, 8,208; 1820, 13,247; 1830, 18,826; 1840, 23,364; 1850, 40,001; 1860, 61,122; 1870, 109,199, of whom 35,455 were colored and 13,757 foreigners, including 6,948 Irish, 4,133 Germans, and 1,235 English; in 1875, estimated at 133,000. The number of families in 1870 was 21,343; of dwellings, 19,545. The number of houses in 1875 was 23,121 (10,944 brick and 12,177 frame). It was incorporated as a city by an act of congress of May 3, 1802. By an act of Feb. 21, 1871, to take effect on June 1 of that year, the charter was repealed, but the territory formerly within the corporate limits continues to be known as the city of Washington. It is 14 m. in circuit, and covers a little more than 9½ sq. m. The greatest length, from Rock creek to the Eastern branch (W. N. W. to E. S. E.), is 4½ m.; greatest breadth, 3¾ m.; average dimensions, about 4 by 2½ m. The Potomac front measures 4 m., and that on the Eastern branch 3¼ m. The site covers an undulating tract having a mean altitude of about 40 ft. above the river. The elevation of the base of the capitol is 89½ ft.; of the highest point in the city, 103·7 ft. Beyond the limits is a circling range of wooded hills. The Tiber, a small stream emptying into the Potomac, runs through the city, but it is entirely built over, and forms part of the sewerage system. The streets, with the exception of those designated as avenues, are laid out at right angles, running due N. and S., and E. and W. The initial streets are North Capitol, South Capitol, and East Capitol with its prolongation W., which extend directly from the capitol in the directions indicated by their names. The streets running N. and S. are numbered from North and South Capitol streets, being known as 1st street E., 1st street W., and so on, as they are E. or W. of the capitol. The streets running E. and W. are lettered from East Capitol street and its prolongation, being known as A street N., A street S., and so on. East Capitol street is 160 ft. wide, and North and South Capitol streets are each 130 ft.; the width of the other streets varies from 70 to 160 ft. There are 21 avenues, named after states of the Union, crossing the streets diagonally, the principal of which radiate from the capitol, white house, or Lincoln square E. of the capitol. Of these 19 are from

120 to 160 ft. wide, and 2 are 85 ft. wide. These streets and avenues divide the city into 1,170 blocks or squares, many of which have been subdivided by streets or alleys from 40 to 65 ft. wide, variously named and not included in the original plan. Pennsylvania avenue, the great business thoroughfare, extending across the city from Rock creek to the Eastern branch, is interrupted by the capitol and the white house, between which it forms the main avenue of communication. Between these points it is 160 ft. wide, elsewhere 130 ft. Massachusetts avenue, N. E. of Pennsylvania avenue, is the handsomest in the city. It runs parallel with the latter, and is 160 ft. wide throughout. The city has an excellent system of sewerage, and since 1871 the streets and avenues have been greatly improved and beautified. They are well graded and paved, ornamented with a variety of shade trees, and well lighted with gas. There are several squares handsomely laid out and containing fountains, trees, and shrubbery. In Lafayette square, N. of the white house, is a bronze equestrian statue of Gen. Jackson by Clark Mills; in Judiciary square, a statue of Lincoln by Lot Flannery; and in Rawlins square, a heroic bronze statue of Gen. John A. Rawlins by J. Bailey. On April 14, 1876, a colossal bronze statue of Lincoln by Thomas Ball, erected by contributions of colored people, was unveiled in Lincoln park. At the intersections of the principal avenues are spaces termed circles. Washington circle, at the intersection of Pennsylvania and New Hampshire avenues, contains an equestrian statue of Washington by Clark Mills; and an unnamed circle N. of the white house, a colossal bronze equestrian statue of Gen. Scott by H. K. Brown. At the intersections of the streets with the avenues are small spaces called triangles, many of which are ornamented. The mall extends from the capitol grounds W. to 15th street, between B street N. and B street S., taking the place of West Capitol street. It contains the botanic garden, the Smithsonian institution (see Smithsonian Institution), and the department of agriculture. The botanic garden, comprising 10 acres, is under the control of a committee of congress. The "park" extends W. from the mall to the banks of the Potomac, and contains the unfinished Washington monument and the government propagating garden and nursery.—The capitol is on the W. brow of a plateau that forms the E. portion of the city. The corner stone was laid by Washington, Sept. 18, 1793, and the N. wing was ready for the first sitting of congress here, Nov. 17, 1800. The S. wing was finished in 1808, and the interior of both wings was burned by the British, Aug. 24, 1814. The reconstruction of the wings was begun in 1815, the foundation of the main building was laid March 24, 1818, and the whole was completed in 1827. An act passed Sept. 30, 1850, provided for the extension of the capitol. The corner stone of the extension was laid July 4, 1851, by President Fillmore, and an address delivered by Daniel Webster. It was finished in 1867. The whole edifice fronts the east. The old building, which now forms the centre, is 352 ft. 4 in. long and 121 ft. 6 in. deep, with a portico 160 ft. wide of 24 Corinthian columns on the east, and a projection of 83 ft. on the west, embracing a recessed portico of

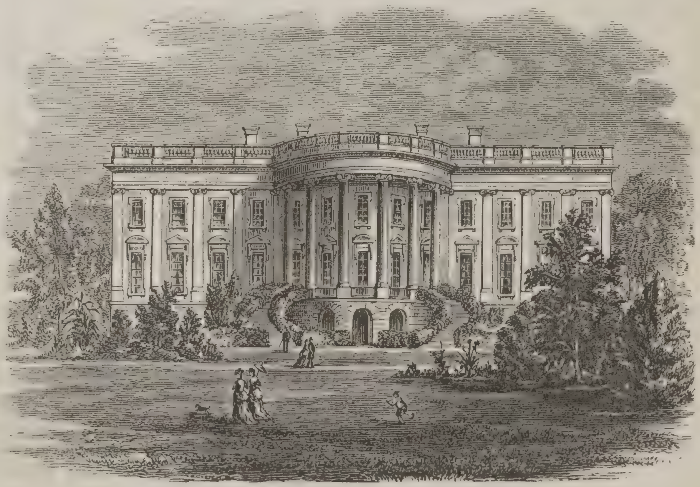


Map of Washington and Vicinity.

1. Capitol. 2. President's House. 3. Statue of Washington. 4. Treasury Department. 5. Corcoran Art Gallery. 6. State, War, and Navy Building. 7. Interior Department. 8. General Post Office. 9. Department of Justice. 10. Department of Agriculture. 11. Observatory. 12. Arsenal. 13. Navy Yard. 14. Smithsonian Institution. 15. Washington Monument. 16. Botanic Garden.

10 coupled columns. The extension consists of two wings placed at the N. and S. ends of the central building, 44 ft. from it, with connecting corridors 56 ft. 8 in. wide, inclusive of their outside colonnades. Each wing is 142 ft. 8 in. in front on the east by 238 ft. 10 in. in depth, exclusive of the porticoes and steps. The porticoes fronting the east have each 22 monolithic fluted columns, and extend the entire width of the front, having central projections of 10 ft. 4 in. forming double porticoes in the centre, the width of the gable. There is also a portico of 10 columns on the W. end of each wing, 105 ft. 8 in. wide, projecting 10 ft. 6 in., and like porticoes on the N. side of the N. wing and S. side of the S. wing, with a width of 121 ft. 4 in. The entire length of the capitol is 751 ft. 4 in., and the greatest depth, including porticoes and steps, is 348 ft. The ground covered by the building, exclusive of courtyards, is 153,112 sq. ft., or a little over 3½ acres. The walls of the central building are of sandstone painted white; the extensions are of white marble slightly variegated with blue. Outwardly the capitol has various architectural adornments, with several groups of sculptures; within it is profusely decorated with frescoes, sculptures, and paintings. From the centre rises a cast-iron dome, 135½ ft. in diameter, to a height of 287½ ft. above the basement floor of the building. From the top of the dome, which is surmounted by a bronze statue of Liberty by Crawford, 19½ ft. high, a magnificent view of the city and surrounding country is obtained. The rotunda is a circular room 96 ft. in diameter, rising to the entire height of the interior of the dome, 180 ft. It contains a number of historical paintings by John Trumbull and others. The senate chamber, in the centre of the N. extension, is rec-

The Capitol.



President's House.

Treasury Department.

tangular, 113 ft. 3 in. long, 80 ft. 3 in. wide, and 36 ft. high; it is surrounded by galleries capable of seating 1,200 persons. The hall of the house of representatives is in the centre of the S. extension, and is 139 ft. long, 93 ft. wide, and 36 ft. high, with a gallery seating 1,000. The hall formerly occupied by the senate, and now by the supreme court, is on the E. side of the N. wing of the central building, and is semicircular, 75 ft. long and 45 ft. high. The court of claims is in the basement of the W. extension of the central building. The old hall of representatives is in the S. wing of the central building, between the rotunda and the present hall of the house, and is the most stately and beautiful apartment in the whole edifice. It is semicircular, 96 ft. long and 57 ft. high, and is now used as the receptacle of the historical statues which congress in 1864 invited the states to contribute, each state to furnish two, and contains other statuary and paintings. The library of congress occupies a fine room 91 ft. 6 in. long, 34 ft. wide, and 38 ft. high, on the west of the rotunda, together with two wings, each 90 ft. 6 in. long, 29 ft. 6 in. wide, and 38 ft. high. The law branch of the library is in an apartment immediately below the supreme court room. The capitol grounds comprise 51½ acres, handsomely laid out and containing a great variety of trees. E. of the capitol is a colossal statue in marble of Washington, by Greenough.—The president's house or executive mansion is in the W. part of the city, 1½ m. from the capitol. It is two stories high, 170 ft. long, and 86 ft. deep, with a portico on the north supported on eight Ionic columns, and a semicircular colonnade on the south of six Ionic columns. It is of freestone, and is painted white, from which circumstance it is popularly known as the "white house." The corner stone was laid in 1792, and the edifice was occupied by President Adams in 1800. It was burned by the British in 1814. In 1815 congress authorized its restoration, and it was again occupied in 1818. The grounds lie between 15th and 17th streets, and extend to the Potomac, comprising about 75 acres, of which about 20 are enclosed as the president's private grounds, are handsomely laid out, and contain a fountain. The treasury department, just E. of the white house, is a magnificent building in the Ionic style, 468 ft. long and 264 ft. wide, three stories high above the basement, with porticoed fronts on all four sides. The E. front is of Virginia freestone; the rest of the building is of Dix island granite. Immediately W. of the white house is a structure in course of erection intended for the accommodation of the

New State, War, and Navy Building.

state, war, and navy departments. It is of granite, in the Roman-Doric style, 471 ft. long and 253 ft. wide, or including projections and steps 567 by 342 ft., and 128 ft. high. It has four façades, those on the north and south and on the east and west respectively being counterparts. It was begun in 1871, and the S. portion was occupied by the state department in 1875. The war and navy departments still occupy plain brick structures, which are to be taken down to give place to the new building. The department of the interior is in a grand Doric building of marble, freestone, and granite, commonly called the patent office. It occupies two blocks, between 7th and 9th and F and G streets, in the central portion of the city, and is 453 ft. long and 331 ft. wide, including porticoes, and 75 ft. high. Besides the patent offices, the edifice contains the pension office, and the offices of public lands and Indian affairs. The most interesting feature is the very extensive collection of inventors' models. On the opposite side of F street is the general post office, a marble structure in the Corinthian style. It is 300 ft. long and 204 ft. wide, and consists of two stories with a rustic basement. Here are the office of the postmaster general, the dead letter office, and the city post office. The department of agriculture occupies a renaissance building of brick and brown stone trimmings, 170 by 61 ft. and three stories high, besides basement and Mansard roof, situated between the Smithsonian institution and the Washington monument. It contains a museum, and has extensive greenhouses. The grounds are handsomely laid out, and contain a great variety of trees and plants. The United States naval observatory (lat. 38° 53′ 38·8″, lon. 77° 3′ 1·8″) occupies a commanding site on the bank of the Potomac in the W. part of the city, in a handsome enclosure of 19 acres. By act of congress the meridian of the observatory is adopted as the American meridian for all astronomical purposes, and the meridian of Greenwich is adopted for all nautical purposes. The department of justice, bureau of education, office of the geological survey of the territories, nautical almanac office, signal office, and coast survey office occupy rented buildings. The army medical museum, the ordnance museum, and the government printing office are noteworthy. The arsenal is at the extreme S. point of the city; the grounds comprise 45 acres, handsomely laid out. The navy yard is on the Anacostia, and contains 27 acres; near it are the marine barracks. The District court house is on Judiciary square; the new jail is in the E. part of the city.—Among the principal buildings not belonging to the government are the masonic temple, odd fellows' hall, and Lincoln hall, which contains the library and reading room of the young men's Christian association. The Corcoran art gallery occupies a fine building near the white house. It was conveyed to a board of trustees for the benefit of the public in 1869 by W. W. Corcoran, a Washington banker. The principal theatres are Ford's opera house and the National theatre. The hotels of Washington are a prominent feature of the city. The principal are the Arlington, Ebbitt, Imperial, Metropolitan, National, St. James, St. Marc, and Willard's. There are five principal markets, of which three have fine buildings. There is a bridge across the Potomac, known as the "long" bridge, for railroad and ordinary travel. The Anacostia is spanned by three bridges (one for railroads only) and Rock creek by four. Horse cars run to every quarter of the city and to Georgetown. Communication with the north is furnished by the Baltimore and Ohio and Baltimore and Potomac railroads; with the west by the Baltimore and Ohio; and with the south by the Alexandria and Washington, which crosses the long bridge. There are two depots. Ferry steamers ply hourly to Alexandria, Va.—The prosperity of Washington depends upon the presence of the national government, and there is very little manufacturing or other business. The city contains five national banks, with an aggregate capital of $1,700,000, three savings banks, a safe deposit company, and 13 insurance companies (two life), with an aggregate capital of $2,650,000. The taxable value of real property in 1875 was $78,818,934, besides which there was about $21,000,000 worth exempt from taxation, not including the public buildings of the general government. The metropolitan police force has jurisdiction throughout the District of Columbia; the fire department is also coextensive with the District. Washington and Georgetown are supplied with water from the great falls of the Potomac above by an aqueduct 12 m. long, which discharges into a distributing reservoir 2 m. from Rock creek and 4½ m. from the capitol. It was begun in 1853 and completed in 1859, and

Corcoran Art Building.

has a capacity of 80,000,000 gallons a day. The distributing reservoir is capable of containing 300,000,000 gallons. From this point the water is conveyed to the cities in three great mains, having a capacity of 300,000,000 gallons a day. The present consumption is 23,000,000 gallons. Two miles above the distributing reservoir is a receiving reservoir, with a capacity of 163,000,000 gallons. Among the charitable institutions, many of which receive aid from the government, are the naval hospital and the Washington asylum, serving as an almshouse and workhouse for the District. The soldiers' home, 3 m. N. of the capitol and beyond the city limits, was established in 1851 for aged or disabled soldiers of the regular army. It occupies a beautiful site, and the grounds, comprising 500 acres, are handsomely laid out and contain several fine buildings. The District reform school for boys, established in 1866, with a farm of 150 acres, is N. E. of the city. The government hospital for the insane, with accommodations for 550 patients, is on the S. E. bank of the Anacostia. It was opened in 1855, and is designed for the insane of the army and navy and the indigent insane of the District of Columbia. The land appurtenant comprises 419 acres, of which 185 are enclosed by a wall. The Columbia institution for the deaf and dumb is on the N. E. border of the city, in a plot of 100 acres. The institution was chartered by congress in 1857, and is designed for deaf-mute children of the District of Columbia and those whose parents are in the army or navy. A collegiate department, the National deaf-mute college, was organized in 1864. This is the only deaf-mute college in the world, and is open to students from all parts of the country.—The public schools of Washington form part of the free school system of the District. Separate accommodations are provided for colored children. There are several fine school buildings. The number of children of school age (6 to 17 years) in the city in 1870, according to the United States census, was 25,935 (17,403 white and 8,532 colored). The following are the school statistics of the city for 1873–'4:

CLASS OF SCHOOLS.	Number of pupils enrolled.		Average attendance.	
Public, white	9,845		7,350	
" colored	4,870		3,422	
" total		14,715		10,772
Private and denominational, white	4,106		3,645	
" " colored	547		452	
" " total		4,653		4,097
All classes		19,868		14,869

The total expenditure for public school purposes amounted to $215,384 82; value of public school property, $910,687. The public schools for whites comprised one normal school and grammar, intermediate, secondary, and primary grades; those for colored children, a preparatory high school and grammar and primary grades. The private and denominational schools given in the table numbered 78, and included 13 night schools and 20 colored schools; besides these, which were for primary instruction, there were 28 academies, &c., for secondary instruction, with 1,454 pupils. In 1874 the public schools of the entire District were placed under the control of a board of 19 trustees, subordinate to whom are two superintendents, one having charge of the white schools of Washington and Georgetown and the white and colored schools outside of those cities, and the other of the colored schools of Washington and Georgetown. Howard university is near the N. border of the city, beyond the limits. (See Howard University.) Columbian university, just N. W. of the city, was incorporated as a college in 1821 and as a university in 1873. It is under the control of the Baptists. Its law and medical departments, the latter known as the National medical college, are in the city. In the collegiate department the degrees of bachelor of letters, of science, and of arts, and of master of arts, are conferred. A preparatory school is connected with it. In 1875–'6 there were 12 instructors and 103 preparatory and 48 collegiate students. Near the Columbian university is Wayland seminary, also under the control of the Baptists, established in 1865 for the education of colored preachers and teachers. It has academic, normal, and theological departments. Gonzaga college, on I street N. of the capitol, is under the control of the Jesuits. It was formerly known as Washington seminary, and was incorporated under its present name in 1858. In the city are also the law and medical departments of Georgetown college (see Georgetown), the National college of pharmacy (established in 1872), and the law department of the National university. The last is the only department organized of a proposed university incorporated in 1870. The congressional library contains (1876) more than 300,000 volumes; Washington library company and young men's Christian association, 15,000; odd fellows', 3,600; masonic, 2,328; Columbian university, 5,750; Gonzaga college, 10,000; Howard university, 8,000; National deaf-mute college, 1,700. The government departments and bureaus have libraries of from 1,500 to 40,000 volumes. Eight daily and eleven weekly (one German) newspapers are published, besides a number of periodicals. There are 117 churches and chapels, viz.: 30 Baptist (19 colored), 1 Campbellite, 1 Congregational, 15 Episcopal (1 colored), 1 Friends', 1 German Reformed, 2 Jewish, 8 Lutheran (1 colored), 10 Methodist (colored), 16 Methodist Episcopal, 1 Methodist Episcopal, South, 3 Methodist Protestant, 13 Presbyterian (1 colored), 1 Reformed Episcopal, 10 Roman Catholic (1 colored), 1 Swedenborgian, 1 Unitarian, 1 United Brethren in Christ, and 1 Universalist.—The permanent seat of the federal government was fixed on the Potomac by an act of congress passed July 16, 1790; in 1791 the site was selected by Washington, and commissioners were appointed to lay out the city. The government was established here in 1800, congress assembling on Nov. 17. On Aug. 24, 1814, the British took possession of the city and burned the public buildings. Washington was under municipal government from 1802 to 1871, when a territorial government was organized for the entire District. This was abolished by the act of June 20, 1874, which placed the District under three commissioners appointed by the president with the consent of the senate. The apprehensions of an attack upon Washington had an important bearing upon military operations during a great part of the civil war. Slight works were begun before the city at an early date, and after the defeat at Bull Run these became formidable, and at times were strongly garrisoned. After Pope's defeat at the second battle of Bull Run, the Union army was concentrated behind the intrenchments at Washington, McClellan being placed in command of all the troops in the vicinity of the capital. In July, 1864, Washington was left actually unguarded, and Lee ordered a sudden raid by which he hoped to induce Grant to withdraw so much of his force around Petersburg and Richmond as to involve at least a temporary raising of the siege. This operation was intrusted to Gen. Early, with about 12,000 men, who crossed the Potomac, and at Monocacy, on the 9th, defeated Gen. Wallace. On the morning of the 11th he was in front of Fort Stevens, almost in sight of Washington. Grant meanwhile had sent Gen. Wright with the 6th corps from Petersburg. On the 12th he attacked Early, who retreated during the night, and recrossed the Potomac.

WASHINGTON, a borough and the county seat of Washington co., Pennsylvania, 31 m. S. W. of Pittsburgh by the Chartiers railroad; pop. in 1870, 3,571. It is connected by a branch of the Baltimore and Ohio railroad with Wheeling, W. Va. There are two iron founderies, a woollen factory, two coach factories, and various other manufactories, a national bank, a savings bank, several schools, three weekly newspapers, and 11 churches, viz.: Baptist, Disciples', Episcopal, Lutheran, Methodist (3), Presbyterian (3), and Roman Catholic. Washington is the seat of Washington female seminary, and of Washington and Jefferson college (Presbyterian), formed in 1865 by the union of Jefferson and Washington colleges. It occupies fine grounds, on which commodious new buildings have been recently erected. It comprises preparatory and collegiate departments, the latter having classical and scientific courses. The libraries contain 8,000 volumes; the endowment amounts to $220,000. In 1875-'6 there were 10 instructors and 21 preparatory and 136 collegiate students. Jefferson college, at Canonsburg, Pa., was chartered in 1802, and grew out of the Canonsburg academy, opened in 1791. Washington college was chartered in 1806, and grew out of Washington academy, chartered in 1787 and opened in 1789. The number of graduates of Jefferson college is 1,890; of Washington college, 846; of Washington and Jefferson college (1876), 298.

WASHINGTON, Bushrod, an American jurist, born in Westmoreland co., Va., June 5, 1762, died in Philadelphia, Nov. 26, 1829. He was the son of John Augustine Washington, a younger brother of George Washington. In the winter of 1780-'81 he volunteered in a troop of horse commanded by Col. J. F. Mercer, and continued in the service till the disbanding of the troop after the siege of Yorktown. He afterward studied law in Philadelphia, practised in his native county, in 1787 was elected to the Virginia house of delegates, and in 1788 was a member of the convention to ratify the constitution of the United States. In 1798 President Adams appointed him one of the judges of the supreme court of the United States. By the will of Gen. Washington he became the possessor of the Mount Vernon estate, and resided there; he bequeathed it to his nephew, John Augustine Washington.

WASHINGTON, George, the first president of the United States, born in Westmoreland co., Va., Feb. 22 (old style, 11), 1732, died at Mount Vernon, Dec. 14, 1799. The house in which he was born was in a parish called by the family name of Washington, near Pope's creek, a small tributary of the Potomac, about half a mile from its junction with that river. It was destroyed by fire during the boyhood of Washington, but in 1815 a stone with a suitable inscription was placed on the spot by George Washington Parke Custis. The family to which Washington belonged has not yet been satisfactorily traced in England. The genealogies accepted by Sparks and Irving and his other biographers have recently been proved to be inaccurate. His great-grandfather, John Washington, emigrated to Virginia about 1657, with his brother Lawrence. George Washington was the son of Augustine Washington and his second wife Mary Ball. After the burning of the house at Pope's creek, his father removed to a house on the Rappahannock, a short distance below Fredericksburg. Here he died in 1743, leaving a large landed property to his widow and five children. To his oldest son Lawrence he bequeathed an estate on the Potomac afterward known as Mount Vernon. George received only the education of the schools of the neighborhood, and his instruction at them did not go beyond reading, writing, and arithmetic, with the addition, which must have been somewhat exceptional, of bookkeeping and surveying. He paid some attention to the French language after the army of Count de Rochambeau arrived in this country, but never attempted to speak or write it. His orthography was rather defective, a very common fault a century ago. Uniform tradition represents him to have attained an early development of physical strength. He took the lead in all the athletic sports and exercises of his companions. Though no great reliance can be placed upon most of the anecdotes which are related of his boyhood and youth, it is certain that he grew up of a vigorous, and in early life spare and agile frame, capable of much physical endurance, remarkably strong in the arms, and a bold and graceful rider. Nor is there any doubt that he early acquired among his contemporaries that character for justice, veracity, and sterling honor, which he sustained through life. His elder brother Lawrence held a commission in one of the American regiments which were sent in 1740 to reënforce the army under Gen. Wentworth and Admiral Vernon, in the unsuccessful expedition against Cartagena. While on this expedition Capt. Lawrence Washington formed intimate personal relations with the admiral, and on his return at the close of the war he gave to his newly occupied residence at Hunting creek the name of Mount Vernon, in honor of that popular naval hero. When George was 14 years old a midshipman's warrant was obtained for him, and it is said that his clothes were packed to go on board ship. His mother alone never cordially approved of the plan, and it was finally abandoned in consequence of her opposition. Tradition represents her as a woman of vigorous character and masculine will. He was trained by her in habits of frugality and industry, to obey rightful authority, and to speak the truth. George Washington had ever been the favorite of Lawrence, and after leaving school passed much of his time at Mount Vernon, occupied in summer with the usual routine of plantation life, and in winter and the studious hours of the year with his favorite branch of surveying, in which he became a great proficient. He made it his profession, and was much employed by the eccentric Lord Fairfax, an English nobleman who had made his home in Virginia, where he had a vast estate and lived in a substantial stone dwelling called Greenway Court, in the Shenandoah valley, which was then a wilderness. Three years were spent in this way, Washington passing the summers in surveying Lord Fairfax's estates, and the winters principally at Mount Vernon. The foundations of his fortune, as far as it was derived from his own acquisitions, were probably laid in part by the knowledge gained by actual inspection of the rich lands in western Virginia, of which he afterward became a large proprietor. In the course of his surveying tours he frequently encountered parties of friendly Indians, and became familiar with their manners, a knowledge which soon stood him greatly in stead. The very scene of his labors as a surveyor, the N. W. frontier of Virginia, became the theatre of those movements and operations which formed the memorable commencement of his military career. The French and Indian war had its origin in the jealousy with which the French government contemplated the projects of the Ohio company, which was formed about this time, and of which Lawrence Washington was an active member. The attention of several of the colonial assemblies, and of that of Virginia among the first, was early called to this subject. In the anticipation of an Indian war, and probably of a rupture with France, the government of that colony began military preparations. The province was divided into districts, in one of which Washington, then but 19 years of age, received the appointment of adjutant with the rank of major. But soon afterward his brother Lawrence was ordered to the West Indies for his health, and it was determined that George should accompany him. They sailed for Barbadoes in September, 1751, and arrived after a voyage of five weeks. They had scarcely been a fortnight in the island when George was attacked with smallpox, by which he was slightly marked through life. Finding no material relief in Barbadoes, Lawrence Washington proposed to remove to Bermuda in the spring, and George was sent back to conduct his sister-in-law to the last named island. He reached Virginia after a most tempestuous voyage; but his brother's health grew rapidly worse, and the proposed removal to Bermuda was abandoned. This was the only occasion on which Washington ever left the American continent. Lawrence Washington returned to Virginia in the summer of 1752, and died shortly after at the age of 34, leaving a large fortune to an infant daughter who did not long survive him. By his will, of which George was one of the executors, the estate of Mount Vernon was, on the demise of the daughter, given to George, who added to it materially by subsequent purchases. Though the youngest of the executors named in the will, owing to his more intimate acquaintance with his brother's affairs, and his prospective interest in the property, the active management of the estate devolved upon him. In the meantime the prospect of a collision on the frontier increased. On the arrival of Dinwiddie as colonial governor, the military establishment was reorganized, and the province was divided into four districts, of which the northern, including several counties, was assigned to Washington as adjutant general. The struggle of the French and English for the possession of the North American continent was the great event of the middle of the 18th century. France intrenched herself on the St. Lawrence and at the mouth of the Mississippi, and aimed by a line of posts through the interior to confine the English to the comparatively narrow strip occupied by the Anglo-American colonies along the coast. The intervening territory, watered by the Ohio, was claimed by both, but settled as yet by neither; in fact, it was occupied by Indians with the exception of a settlement of twelve Virginia families headed by Capt. Gist, who had established themselves on the Monongahela. The Canadians erected a fort on a branch of French creek, about 15 m. S. of Lake Erie, and sent emissaries to the tribes N. W. of the Ohio to persuade them to break up the infant settlements of the Ohio company. Some of the Anglo-American traders, it is said, were seized and sent to France. Gov. Dinwiddie, either for the purpose of protesting against these measures of the French, or perhaps of obtaining authentic information of their character, determined to despatch a special messenger to the residence of the French commandant. After others to whom this appointment had been offered had declined it, it was accepted by Washington. The distance to be traversed, most of the way through a wilderness, was between 500 and 600 m.; winter was at hand, and the journey was to be made without military escort, through a territory occupied by Indian tribes. Washington started from Williamsburg Nov. 14, 1753. At Gist's settlement on the Monongahela he was joined by Gist, with whom he visited the French post, delivered his despatches, received a reply, and started for home. His return was accompanied by great danger from Indians and from frozen rivers. He narrowly escaped assassination by a treacherous guide, and was nearly drowned in crossing the Alleghany. Washington's journal of this perilous expedition, sent by Gov. Dinwiddie to London and published there, was regarded in England as a document of no little importance for the light which it shed on the designs of the French government with respect to the interior of this continent. The report of Washington left no doubt on the mind of Gov. Dinwiddie that all attempts to extend the settlements toward the Ohio would be forcibly resisted by the Canadian government. He accordingly convened the assembly, and recommended active measures of preparation, at the same time calling the attention of the other colonial governors to the impending danger. Virginia voted to raise a regiment of six companies, and one company under Capt. Trent was immediately sent to take possession of the point at the confluence of the Alleghany and Monongahela (the present site of Pittsburgh), which Washington had especially recommended as the site of a fort. The command of the regiment was given to Col. Fry, and Washington, who had refused to be a candidate for the colonelcy, was appointed lieutenant colonel. He moved forward with a part of the force as soon as it could be got ready to take the field, and the chief command before long devolved upon him by the death of Col. Fry. The instructions of Gov. Dinwiddie to the commander of the regiment assumed the existence of a state of war, and commanded him "to drive away, kill and destroy, or seize as prisoners all persons, not the subjects of the king of Great Britain, who should attempt to settle or take possession of the lands on the Ohio river or any of its tributaries." Washington reached Will's creek, on his way to the Ohio, on April 20, 1754. Here he was met by the intelligence that Capt. Trent's party, while building the fort, had been compelled by an overwhelming force of French and Indians to abandon the work. The French completed it, and called it Fort Duquesne, in honor of the governor of Canada. Although it eventually appeared that the reported numbers of the French and Indians were enormously exaggerated, the state of affairs was extremely critical. Washington, however, advanced as rapidly as possible. Having received information from the friendly Indians that a party of French had been out for two days, determined to attack the first body of English they should meet, as a measure of precaution he threw up an intrenchment on the Great Meadows. Gist also brought him information that a party of 50 French had been at his settlement the day before, and that he had seen their tracks within five miles of the Great Meadows. This information was confirmed during the night by an express from the chief of the friendly Indians. Washington placed himself at the head of 50 men, and in company with a band of friendly Indians, after a forced and laborious night march, came upon the enemy at an early hour the next morning (May 28). The French were completely surprised, and a brief action followed. M. Jumonville, the French commander, and 10 of his men were killed, and the rest of the party (except one who escaped), 22 in number, were taken prisoners. On the side of the Virginians, one was killed and two or three were wounded. The prisoners were marched to the Great Meadows, and thence under guard to Williamsburg. Considerable reënforcements were raised and advanced as far as Winchester; but, with the exception of an independent company from South Carolina under Capt. Mackay, none of them reached the Great Meadows, where the whole force amounted to less than 400 men. As Washington anticipated after the defeat of Jumonville's party, a strong force was put in motion against him from Fort Duquesne. He strengthened the intrenchment at the Meadows, and named it Fort Necessity. Capt. Mackay, as an officer holding a royal commission, claimed precedence of the provincial colonel. To prevent a collision of authority, Washington advanced with his regiment, leaving Mackay and his company as a guard at the fort. Two weeks were required to force a march of 13 m., through a gorge of the mountains, to Gist's settlement. Here authentic information was received that the enemy at Fort Duquesne had been strongly reënforced, and might be shortly looked for. Washington having determined to make a stand at the settlement, Capt. Mackay was sent for and promptly brought up his company. It was however decided by a council of war that the enemy was too strong to be resisted, and a retreat to Fort Necessity was deemed expedient. The retrograde movement occupied two days, and they were soon attacked by a greatly superior force of French and Indians. At 11 o'clock at night the French commander proposed a parley. Suspecting this to be a *ruse* to send an officer into the fort in order to obtain information as to its condition, the offer was twice declined by Washington, but was at length accepted. The terms of the capitulation were honorable. The Virginians were to retain everything in their possession but the artillery, to march out of the fort with the honors of war, and to be allowed to retreat unmolested to the settlements. Notwithstanding the disastrous termination of the campaign, not the slightest reproach was cast on Washington. In 1755 two regiments of royal troops were sent out under the veteran Braddock, with which and the provincials of Virginia the campaign was opened. Washington, disgusted with the precedence enjoyed by the officers of the regular army, threw up his commission, but tendered his services as a volunteer aide to Gen. Braddock, who gladly accepted them. In consequence of a severe illness Washington was left behind at the Great Meadows, where he consented to remain only on condition that he should be allowed to join the army before an engagement took place. In the memorable event of July 9, 1755, known as Braddock's defeat, Washington was almost the only officer of distinction who escaped from the calamities of the day with life and honor. The other aides of Gen. Braddock were disabled early in the action, and Washington alone was left in that capacity on the field. In a letter to his brother he says: "I had four bullets through my coat, and two horses shot under me, yet I escaped unhurt, though death was levelling my companions on every side." His fellow aide, Col. Orme, who was the witness of his conduct, says he discharged the perilous duties which devolved upon him "with the greatest courage and resolution." A seal which had been carried by Washington, with his initials, probably shot away from his person, was found after a lapse of 80 years on the field of battle. No attempt was made by the French to pursue their advantage, but the reverse at Fort Duquesne naturally caused a general alarm in the province. A force of 2,000 men was raised by the assembly, of which the chief command, notwithstanding the recent disasters and the preference of another candidate by the governor, was conferred on Washington. His headquarters were established at Winchester, and the duty of protecting the frontier devolved upon him till the end of the war. The unfailing embarrassments of such a service, the impatience of a militia force raised by drafting and impressment, unpaid and poorly clad, the frauds of contractors, contradictory and preposterous orders from the governor, the intrigues of rivals seeking to supplant him, the arrogant pretensions of a subordinate, and wholesale desertions on the approach of danger—these were some of the difficulties with which he had to contend for the rest of the war. In February, 1756, Washington made a hurried visit to Boston, the headquarters of Gov. Shirley of Massachusetts, who had lately been appointed commander-in-chief of the royal forces in North America. His object was to submit to the governor the question of precedence which had sprung up between the provincial officers and those commissioned by the crown; it was justly decided in favor of precedence according to seniority. The years 1756 and 1757 passed without any important military event in the southern department; but the labors and care of his station told upon the strong constitution of Washington, and he was prostrated with a fever for four months. In 1758 he held the chief command of the Virginia contingent in the ill-conducted and all but abortive campaign under Gen. Forbes against Fort Duquesne. Nearly all the faults of Braddock's expedition were repeated, and with a narrow escape from the same results. Washington formed a matrimonial engagement with Mrs. Martha Custis, the wealthy widow of John Parke Custis, in the summer of 1758, and married her on Jan. 17, 1759. Having been five years in the military service, and vainly sought promotion in the royal army, he took advantage of the fall of Fort Duquesne and the expulsion of the French from the valley of the Ohio to resign his commission. His proved courage, discretion, and resources had gained for him the confidence of the conceited and pragmatical Dinwiddie and the headstrong and arrogant Braddock, as they did afterward of the circumspect and persevering Forbes; but in England they earned for him nothing but a good-natured rebuke from George II. and a sneer from Horace Walpole.—Shortly after his marriage, Washington removed to Mount Vernon, where he enlarged the mansion, embellished the grounds, and added to the estate. As a member of the provincial assembly, his winters were passed in Williamsburg. He was at no period an active partisan leader, but at all times and in all assemblies he exercised a paramount influence by soundness of judgment and weight of character. Tobacco and wheat were, before the revolution, the staple products of his plantations. The wheat was ground to flour upon the estate, and what was not wanted for home consumption was sold at Alexandria or shipped from the river. The tobacco was usually shipped directly to Liverpool, Bristol, or London, from which a part of the returns were received in English manufactures. The management of a large estate under such a system partook somewhat of the nature of commerce. Invoices of the articles to be exported and orders for the articles to be received in exchange were to be made out with mercantile exactness. Account books were to be kept and an extensive correspondence carried on. All this labor was performed by Washington with his own hand, and with remarkable precision and neatness. The estate at Mount Vernon, as it was in the latter years of his life, consisted of about 8,000 acres. One half of this was in wood or uncultivated lawns, but about 4,000 acres were in tillage, and managed directly by Washington himself. The cultivated lands lay in five farms, each with its appropriate set of laborers directed by an overseer, the whole, during his long absences from home, under a general superintendent. During his absence each of the overseers was required to make a weekly written report to the superintendent, containing a minute account of everything done on the farm in the course of the week, including the condition of the stock and the number of days' work performed by each laborer. These reports were recorded in a book by the superintendent, who then sent the originals in a weekly letter to Gen. Washington. A weekly answer was returned; usually a letter of four pages, sometimes of twice that length, carefully prepared from a rough draft, then neatly transcribed by the writer, after which a press copy was taken. The rotation of crops in his numerous fields was arranged by himself for years beforehand. The culture of tobacco was given up in the latter part of his life, as exhausting to the soil and unfavorable to the health of the laborers. Being the proprietor of a large landed property in eastern Virginia, Washington was, as a matter of course, a slaveholder. He inherited a plantation cultivated by slaves, and their number was largely increased by the dowry of his wife. The whole number belonging to the estate of Washington in his own right, at the time of his decease, was 124; the "dower negroes," as they are styled in his will, were probably as numerous. His correspondence shows him to have been a strict and vigilant, but at the same time a kind, just, and considerate master; not more careful of his own interests than of the health and comfort of his dependents. As early as 1786 he had formed a resolution never, unless compelled by particular circumstances, "to possess another slave by purchase." In a letter written to Mr. Morris in that year he says: "There is not a man living who wishes more sincerely than I do to see a plan adopted for the abolition of slavery. But there is only one proper and effectual mode by which it can be accomplished, and that is by legislative authority; and this, as far as my suffrage will go, will never be wanting." This sentiment recurs in several parts of his correspondence. In accordance with the views which he had so long entertained, he provided by his will for the freedom of his slaves on the decease of his wife. "To emancipate them before," he remarks in his will, "would, though earnestly wished by me, be attended with such insuperable difficulties, on account of their intermixture by marriage with the dower negroes, as to excite the most painful sensations, if not disagreeable consequences to the latter, while both descriptions are in the occupancy of the same person, it not being in my power, under the tenure by which the dower negroes are held, to manumit them." For the support and education of those emancipated, and especially for the support of his favorite servant Billy, provision was made by his will. In 1770, accompanied by his friend Dr. Craik, Washington made a journey to western Virginia. From Pittsburgh the party descended the Ohio in river boats. Among their objects in visiting the Great Kanawha was the selection of fertile lands in that region still lying in a state of nature.—Washington was a member of the house of burgesses during the whole period of that war of legislation in England, and popular resistance and agitation in the colonies, which preceded the appeal to arms. His military education, his great stake as a property holder, and his habitual respect for lawful authority led him, as they did all others of his class, to deprecate a rupture with the mother country; but the moment it became evident that the connection could be kept up only by the sacrifice of the principle that representation and taxation should go hand in hand, he placed himself in the front rank of the patriots. The principles which guided him are summarily expressed in a letter written from Philadelphia, during his attendance as a member of the first continental congress in the autumn of 1774, to Capt. Mackenzie, a brother officer of the old war, then stationed in Boston. "I think," said he, "I can announce it as a fact, that it is not the wish nor the interest of the government of Massachusetts, or any other government upon this continent separately or collectively, to set up for independence; but this you may rely upon, that none of them will ever submit to the loss of those valuable rights and privileges which are essential to the inhabitants of every free state, and without which life, liberty, and property are rendered totally insecure." On April 19, 1775, the appeal to arms was made at Lexington and Concord; and the continental congress, which in the preceding October had vowed eternal loyalty to George III., on June 15 following unanimously elected George Washington commander-in-chief of the armies of the revolution. (See United States.) The war was conducted by Washington under every possible disadvantage. He engaged in it without any personal experience in the handling of large bodies of men, and this was equally the case with all his subordinates. The continental congress, under whose authority the war was waged, was destitute of all the attributes of an efficient government. It had no power of taxation, and no right to compel the obedience of the individual. The country was nearly as destitute of the *matériel* of war as of the means of procuring it; it had no founderies, no arsenals, no forts, no navy, no means, no credit. The opposing power had all the prestige of an ancient monarchy, of the legitimate authority, of disciplined and veteran armies, of a powerful navy, of the military possession of most of the large towns, and the machinery of government for peace and war. It had also the undoubted sympathy of a considerable portion of the people, especially of the wealthy class. That Washington, carrying on the war under these circumstances, met with frequent reverses, and that the progress of the revolution as conducted by him seemed often languid and inert, is less wonderful than that he rose superior to such formidable obstacles, and was able, with unexhausted patience and matchless skill, to bring the contest eventually to an auspicious and honorable close. He took command of the forces besieging Boston on July 3, 1775. No event of great significance followed for eight months. The country fretted under the inaction of the army; the army languished under indiscipline, the homesickness of raw troops, inoculation for smallpox, the want of every requisite for strength or comfort, and especially a military chest. The evacuation of Boston on March 17, 1776, was the glorious reward of the perseverance and skill of the commanding general. Then followed, in rapid succession, the disasters of Long Island, of Fort Washington, and of the calamitous retreat through the Jerseys. The brilliant *coup de main* of Trenton and the substantial success of Princeton restored the drooping courage of the people; but they were followed by the reverse at Brandywine, the unsuccessful blow at Germantown, and the terrible winter at Valley Forge. The next summer (1778) the courage and skill of Washington turned a disgraceful commencement of the day at Monmouth into a substantial victory; but from that time forward no brilliant success attended the forces under his immediate command till the final blow was struck, with the overwhelming numbers of the combined American and French forces, at Yorktown. After this great success the war still dragged out a lingering existence. More than two years elapsed from the capitulation of Yorktown (October, 1781) to the evacuation of New York (Nov. 25, 1783). Events like these do not surely make a brilliant military career, when tried by the popular standard of success. At times they shook even the well established popularity of Washington. The all-important success of Gates at Saratoga formed an unsatisfactory contrast with Brandywine and Germantown, which occurred in the same campaign. The second place in the army was held for three years by Gen. Charles Lee, a turbulent and empty braggart, perpetually laboring in secret to undermine the popularity which he dared not openly assail; while cabals and boards of war in congress endeavored, by disgusting the commander-in-chief, to drive him to resignation. But in vain. The country saw that he was doing his best with his wretchedly limited means; that he was hopeful while others were despondent; that he was wise and prudent, while others were indiscreet, or feeble, or rash; in fact, that the cause was embodied in him and in his hold on the heart of the people.—On Dec. 23, 1783, Washington, in a parting address of surpassing beauty, resigned his commission as commander-in-chief of the army to the continental congress sitting at Annapolis. He retired immediately to Mount Vernon, and resumed his occupation as a farmer and planter, anxiously shunning all connection with public life. Much of his time, however, was occupied by a laborious correspondence on the infinity of subjects connected with the revolutionary war, and by the throng of visitors from every part of the Union and of Europe. In 1784 he crossed the Alleghanies, partly to look after his lands in that region, and partly to explore the head waters of the rivers which rise in the interior of Virginia, with a view to their connection with the western waters. On his return he addressed a memoir on this subject to the legislature of Virginia, which led to the organization of the James River and Potomac canal companies. In acknowledgment of his agency on this occasion, and still more of his revolutionary services, the state of Virginia presented him with 50 shares in the Potomac canal, valued at $10,000, and 100 shares in the James River canal, valued at $50,000. He accepted the donation only as the trustee of some public object. The shares in the James River canal were appropriated by him for the endowment of a college at Lexington in Rockbridge co., Va., which in consequence assumed the name of Washington college. The shares in the Potomac canal were appropriated as the endowment of a university at the seat of the federal government.—The United States, as is well known, after the revolution, fell into a state of governmental inanition bordering on anarchy. The recommendations of the continental congress were without weight, no revenue accrued to the treasury, and the European debt, principal and interest, remained unpaid. Foreign governments held the United States in low repute; the Indian tribes scourged the frontier; the separate states, instead of acting in harmony, enacted conflicting laws for imposing duties on foreign commerce; in a word, discontent was universal. To put an end to the controversies between Maryland and Virginia relating to the navigation of the rivers which divided their territories, a meeting took place at Alexandria in 1785, and while there the members made a visit to Mount Vernon. This led to the call of a convention of delegates, which was assembled at Annapolis in 1786, of which the object was "to take into consideration the trade of the United States; to examine the relative situation and trade of the said states; and to consider how far a uniform system in their commercial regulations may be necessary to their common interest and permanent harmony." The delegates of five states only attended this meeting, and some of them with powers too limited for any valuable purpose. They drew up a report, recommending a meeting in Philadelphia the following May, under the sanction of the continental congress. Washington warmly approved these proceedings, though from some motive of personal delicacy, perhaps as a riparian proprietor on one of the rivers whose navigation was the original cause of the movement, he declined to serve as a delegate to the preliminary meeting; but he was a member of the convention which met at Philadelphia in May, 1787, and framed the constitution of the United States. Washington was unanimously elected its president; but, as is usual in deliberative bodies of this kind, most of the business was transacted in committee of the whole, Nathaniel Gorham of Massachusetts being placed by Washington from day to day in the chair. On Sept. 17, 1787, the fruit of the labors of this patriotic body was given to the people of the United States, with an official letter from the president of the convention; and having been ratified by the requisite number of states, it went into operation in 1789. This constitution, though not deemed perfect in every point by Washington, was regarded by him as the best that could be hoped for, the only alternative for anarchy and civil war. It was far from being warmly or generally welcomed; and it is doubtful whether it would have been ratified but for the transcendent popularity of Washington, who was instinctively marked out by public expectation as the first president. He was chosen by the unanimous vote of the electoral colleges, New York alone not having taken interest enough in the organization of the government to appoint electors. John Adams was elected vice president. Another striking proof of the stagnation of interest in the new constitution may be seen in the fact that, although the 4th of March, 1789, was fixed upon for the meeting of the first congress, a bare quorum of the house of representatives did not assemble till the 1st of April, nor of the senate till the 6th; and it was not till the 30th that President Washington was inaugurated. In the summer the newly elected president had a dangerous fit of illness at New York, then the seat of government. His disease was a malignant carbuncle in the thigh, which was cured by a surgical operation skilfully performed by Dr. Bard the younger. In the autumn of this year the president made a tour through the eastern states, travelling with his own horses and carriage. A similar journey was made through the southern states in the following spring. These tours were attended with an unbroken series of ovations. The constitution of 1789, as far as the objects are concerned for which the Union was framed, created a government as complete as the government of Great Britain or France; and Washington was called to put this newly framed and untried government into operation. He called to his cabinet Mr. Jefferson for the department of state, Mr. Hamilton for the treasury, and Gen. Knox for the department of war. There was for some years no navy or naval department. Foreign affairs were in an unsatisfactory condition. England allowed eight years to pass from the treaty of 1783 before she sent a minister to the United States, although a minister was early sent to London by the congress of the confederation. In the mean time active causes of irritation existed between the two countries: on the part of the United States, the obstacles thrown by state legislation in the way of recovering debts due to British subjects; on the part of England, the detention of the western posts and the impressment of American seamen. The states general met in France the same year that the constitution of the United States went into operation. Our relations with that country soon fell into inextricable confusion. A considerable debt was due to France and Holland. General apathy, distrust, and uneasy expectation reigned at home. Out of this chaos order was speedily educed by the administration, guided by Washington's own consummate prudence, and notwithstanding the existence in the cabinet itself of early developed elements of discord. The discussions with Great Britain after the arrival of the first minister in 1791 were skilfully and patiently conducted by Mr. Jefferson. The insults of the French envoys were mildly repelled or borne with a stoical equanimity, in remembrance of the services rendered to us by France in the hour of trial. The genius of Hamilton gave us the funding system, and with it revenue and credit. The assumption of the state debts created living capital out of the ashes of revolutionary bankruptcy. Our commerce, protected by a national flag and emancipated from the colonial restrictions of Great Britain, began to whiten every sea; and the vacant lands in the western counties of the Atlantic states filled up with a rapidly increasing population. The settlement of the territories on the right bank of the Ohio was prevented, during the first administration of Washington, by the non-surrender of the western posts. Their detention by Great Britain gave strength and audacity to the Indian tribes, and entailed upon the frontier the disasters of two unsuccessful campaigns, that of Harmer in 1790, and especially that of St. Clair in 1791. The first measures of the administration in the organization of the government, the establishment of the courts of justice and the machinery for collecting duties on imports, were not attended with serious political embarrassment. Little was required to be done by the president but to give his official sanction to the acts of congress. There were, however, not only in that body, but in the cabinet, conflicting tendencies. The party which had opposed the adoption of the constitution, and were thence known as anti-federalists, were now opposed to the system of policy which was designed to strengthen the general government; while the federalists, who had procured the adoption of the constitution, were in favor of measures that would give efficiency to the central power, and make the Union a reality instead of a name. The latter party was represented in the cabinet by Hamilton, the secretary of the treasury, supported by the secretary of war, Gen. Knox; the former by Jefferson, the secretary of state, sustained by Randolph, the attorney general. Neither of these latter gentlemen, however, had opposed the adoption of the constitution. On the contrary, Randolph had vigorously supported it in the Virginia convention, and Jefferson, being in France at the time, had taken no active part on the question of its adoption. Washington exerted all his influence to moderate between the diverging tendencies of his cabinet councillors. The details of the funding system, the assumption of the state debts, and the establishment of the bank of the United States were the measures which revealed in all its strength this division of opinion in the cabinet, the legislature, and the country. All of every party were, or professed to be, in favor of some measure for funding the national debt and creating a solvent treasury; but the details of the measures necessary to this end afforded much occasion for controversy. Washington listened with the utmost candor and patience to the opposite opinions of the members of his cabinet, but eventually gave his support to the general views of the secretary of the treasury. The conflict was most violent on the subject of assuming to a limited extent the revolutionary debt of the individual states. This was large in some of the states, and small or null in others. The states of the latter class, principally those of the south, were unwilling that the common treasury should assume a burden from which no benefit would accrue to them. The fact that these state securities, like those of the Union, had passed from the hands of the original holders at a greatly depreciated rate, was the ground of a popular objection to the entire policy of assumption. Congress was about equally divided on the subject, as also upon a measure which was contemporaneously under discussion, that of a permanent seat for the general government. The first congress met at New York and the second at Philadelphia. A majority of the members from the northern and middle states were desirous of making the latter city the permanent metropolis of the Union. An arrangement was finally made in reference to the two questions, in virtue of which the state debts were assumed to the amount of $20,000,000, and the seat of the federal government was established on the banks of the Potomac. It was understood that this settlement was in full concurrence with the wishes of the president. In fact, no object was nearer his heart than to prevent the growth of an embittered party spirit, especially when it assumed the form of a sectional division. His official course, as far as possible, tended to check this great evil, and the most earnest and affectionate appeals were made by him in private to the two great leaders of the opposite parties in his cabinet. From an early period there was a great resort of visitors to the seat of government. The president held a reception for men on Tuesday, on Friday afternoon Mrs. Washington received both sexes, and on Thursday there was a dinner party for invited guests. Washington was sensitive to the cavils of which his receptions were the subject, and bestowed more attention perhaps than they deserved on the attempt to show their injustice. He probably cared little for them in themselves, but regarded them as indications that in time his hold on the public confidence might be shaken with reference to matters of greater importance. These feelings, and a growing wish to return to the tranquil enjoyments of private life, determined him, as the close of his first administration approached, to announce the purpose of declining a reëlection. With this object he requested the assistance of Mr. Madison in preparing a valedictory address to the people. But his purpose was overcome by the warm dissuasions of personal and political friends of all parties, and in the autumn of 1792 he was unanimously reëlected. Adams was reëlected vice president. The great rivals in the cabinet gave place to men of inferior ability, but pursuing the same line of policy as their predecessors. Decisive measures were adopted in reference to foreign relations. The proclamation of neutrality rescued the country from the imminent peril of being drawn into the vortex of the French revolution. (See GENEST, EDMOND CHARLES.) The treaty negotiated with England by Chief Justice Jay settled several of the subjects of controversy with that country. The victory of Wayne broke the power of the Indians in the northwest, and the treaty of Greenville and the surrender of the western posts under Jay's treaty assured the peace of the western frontier. The general tranquillity was for a season disturbed by the "whiskey insurrection" in the western counties of Pennsylvania; but a body of 15,000 of the militia of the neighboring states was called out by President Washington, and the insurrection was crushed in one short campaign, without an effusion of blood. It might have been hoped that in thus scattering the clouds of foreign war, giving safety to a vast unsettled frontier, infusing life into every branch of industry, and conducting the country step by step in the path of an unexampled prosperity, the popularity of the president, which indeed could not have been augmented, would at least have been sustained. At no period of his life, however, was it so materially impaired as in the last years of his second administration, and nowhere so much as in Virginia. Early in 1796 he formed the irrevocable purpose of retiring, and took counsel with Hamilton, no longer his official adviser, but still retaining all his confidence, as to the preparation of his "Farewell Address." This was issued to the country Sept. 17, 1796. At the close of the next session of congress Washington retired, as he thought for ever, from the public service, and withdrew to Mount Vernon. But a year had hardly elapsed before our long standing controversy with the directory of France culminated in a quasi war. Measures of preparation, military and naval, were adopted by congress, and Washington was appointed lieutenant general of the armies of the United States. He had never believed that the government of France would push the controversy to the arbitrament of war; but he did not live to see the threatening cloud dispersed. The commencement of the month of December, 1799, found him in remarkably good health, approaching the close of his 68th year, and in the entire enjoyment of his physical and mental faculties. On the morning of Thursday, the 12th, after writing to Hamilton, he took his usual ride around his farms. The day was overcast when he started, and about one o'clock "it began to snow, soon after to hail, and then turned to a settled cold rain." He remained for two hours longer in the saddle, and on his return home sat down to dinner without changing his dress, although the snow when he came into the house was clinging to his hair. The next day there was three inches of snow on the ground in the morning, and Washington, complaining of a cold, omitted his usual ride. As it cleared up in the afternoon, he went out to superintend some work upon the lawn. He passed the evening as usual, reading the papers and answering the letters of the day, and in conversation with his secretary. Between 2 and 3 o'clock in the morning of Saturday he awoke Mrs. Washington, telling her he had had an ague fit and was very unwell; but he would not allow the family to be disturbed for aid. At daybreak his secretary was called, and his physician, Dr. Craik, who lived at Alexandria, was sent for. At sunrise he was bled by one of his overseers, but with little relief, and he rapidly grew worse. Dr. Craik arrived about 11 o'clock; bloodletting was repeated, and other remedies were adopted, but without effect. Two consulting physicians arrived during the day, and venesection was again attempted. About half-past 4 he requested Mrs. Washington to bring two papers from his study. Having examined them, he gave her back one to be destroyed, and the other to be preserved as his will. He continued to speak and swallow with increasing difficulty, and suffered great pain, but retained his faculties to the last, and gave a few directions relative to his affairs and his burial. About 4 o'clock in the afternoon he said to Dr. Craik: "I die hard, but I am not afraid to go. I believed from my first attack that I should not survive it. My breath cannot last long." At 6 o'clock, as the three physicians stood by his bedside, he said to them: "I feel myself going; I thank you for your attentions, but I pray you to take no more trouble about me. Let me go off quietly; I cannot last long." About 10 o'clock, after several ineffectual attempts to speak intelligibly, he said to Mr. Lear, his secretary: "I am just going; have me decently buried, and do not let my body be put into the vault till three days after I am dead." He presently said: "Do you understand me?" and on Mr. Lear's replying that he did, Washington said: "It is well." These were the last words which he spoke. Between 11 and 12 o'clock, and about 10 minutes before he died, his breathing became easier. He lay quietly, withdrew his hand from Mr. Lear's, and felt his own pulse. At this moment his countenance changed, his hand fell from his wrist, and he expired without a struggle. The disease of which he died was "acute laryngitis," of rare occurrence, and never described till ten years later by Dr. Matthew Bailey of London. In the house of representatives of the United States, appropriate resolutions drawn by Gen. Henry Lee, one of the members from Virginia, were, in his absence, moved by his colleague John Marshall, soon after appointed chief justice of the United States. They express the public sorrow at the loss of him who was "first in war, first in peace, and first in the hearts of his fellow citizens." This expression is repeated in the funeral oration pronounced by Gen. Lee, at the request of the committee of arrangements, with the substitution of the word "countrymen" for "fellow citizens," and it is now usually quoted with that change.—Washington was 6 ft. 2 in. high, his person in youth spare but well proportioned, and never too stout for prompt and easy movement. His hair was brown, his eyes blue and far apart, his hands large, his arms uncommonly strong, the muscular development of his frame perfect. He was a bold and graceful horseman, and followed the hounds with eagerness and spirit. He was scrupulously attentive to the proprieties of dress and personal appearance; his manner was gracious and gentle, especially toward the young, with a certain military reserve in public circles. He was childless, but most happy in his domestic relations. His wife was of the same age as himself, comely and amiable; she brought him a large fortune, presided over his household with punctuality and order, received and entertained his guests with gracious hospitality, and in all respects adorned his official station and cheered his private life. On the death of her son, Col. John Parke Custis, at Yorktown, leaving four children, the two youngest, Eleanor Parke Custis, afterward married to her cousin Major Lewis, and George Washington Parke Custis, were adopted by Washington and brought up as children at Mount Vernon. An original full-length statue by Houdon in the capitol at Richmond is accepted as the standard likeness of Washington. The attitude is rather stiff, and the forehead, as in most French works of art at that period, probably somewhat too retreating. A succession of portraits, from that of the elder Peale in 1770 to that of Sharpless in 1796, exhibit his countenance, and some of them his person, with various merit and success, and through all the changes wrought by a quarter of a century. To all the other traits of excellence in his character he added profound convictions of religious truth, firm faith in an overruling Providence, and reverence for the Christian church, of which he was a communicating member.—See "The Writings of George Washington, being his Correspondence, Addresses, Messages, &c., with a Life of the Author, Notes, and Illustrations," by Jared Sparks (12 vols. 8vo, Boston, 1834–'7; the "Life" published separately, 8vo, 1839); the "Life of George Washington," by Chief Justice Marshall (5 vols. 8vo, Philadelphia, 1805; revised and abridged, 2 vols., 1832), and by Washington Irving (5 vols. 8vo and 12mo, New York, 1855–'9); and smaller biographies by David Ramsay, James K. Paulding, C. W. Upham, J. T. Headley, Mrs. C. M. Kirkland, and others.

WASHINGTON, William Augustine, an American soldier, born in Stafford co., Va., Feb. 28, 1752, died in Charleston, S. C., March 6, 1810. He was the son of Baily Washington, and was educated for the ministry, but entered the continental army with the rank of captain. He took part in the battles of Long Island, Trenton, and Princeton, and afterward commanded a troop of light horse in South Carolina. For his conduct in the battle of Cowpens he received a silver medal from congress. He was captured at Eutaw Springs (1781) and kept a prisoner till the close of the war, when he settled in Charleston. In 1798 he was made a member of Gen. Washington's staff with the rank of brigadier general.

WASHINGTON AND LEE UNIVERSITY, an institution of learning at Lexington, Va. Its germ was the Augusta academy, a mathematical and classical school established by Robert Alexander near the site of Greenville in Augusta co. In 1776 its name was changed to Liberty Hall. In 1785 the institution was removed to near Lexington, and in 1803 to its present site within the limits of the town. It was chartered in 1782. In 1796 George Washington gave to it the 100 shares of stock in the James River canal company which the legislature had granted to him, and the name of the institution was changed to Washington college. In consideration of retiring this stock the legislature agreed to pay to the college 6 per cent. on $50,000 annually for ever. In 1803 the Cincinnati society appropriated their funds, amounting to nearly $25,000, to Washington college; and in honor of this endowment the "Cincinnati professorship" was founded. The "Robinson professorship" was created by an endowment of $40,000 realized from a bequest made in 1826 by John Robinson, one of the trustees. During the civil war its sessions were suspended. In June, 1864, when Lexington was occupied by Gen. David Hunter, much damage was done to the institution; its chemical and philosophical apparatus was destroyed and its libraries were greatly injured. After the war liberal contributions were received from various parts of the country. Soon after the death of Gen. R. E. Lee in 1870 the name was changed to its present form. The presidents of the college, with the dates when they entered upon their duties, have been as follows: the Rev. William Graham, 1782; Samuel L. Campbell, M. D., 1796; George A. Baxter, D. D., 1799; Louis Marshall, M. D., 1830; Henry Vethake, LL. D., 1834; Henry Ruffner, D. D., LL. D., 1836; George Junkin, D. D., 1848 to 1860; Gen. Robert E. Lee, 1865; Gen. G. W. Custis Lee, 1871.—A distinguishing feature of the system of instruction is the arrangement of courses of study into distinct elective schools or departments. The student may select such schools as he wishes, not fewer than three in the academic department; but in each there is a prescribed course of studies, from one to three years, which he is required to pursue. The several schools are adapted to certain courses of study, to each of which is attached a corresponding degree. Instruction is by lectures and

Washington and Lee University.

recitations, of which 18 must be attended weekly by each student. The government of the university is vested in a board of trustees, and the immediate administration of its affairs in the president and faculty. The schools are as follows: 1, Latin; 2, Greek; 3, modern languages; 4, English language and philology; 5, moral philosophy; 6, history and literature; 7, mathematics; 8, applied mathematics (civil and military engineering and astronomy); 9, natural philosophy; 10, chemistry, mineralogy, and geology; 11, applied chemistry and mining; 12, civil and mining engineering; 13, law and equity. Courses of instruction are provided in July and August, chiefly for teachers and students desiring to enter advanced classes at the next regular session. The academic degrees conferred are those of bachelor of philosophy, of science, and of arts, master of arts, and doctor of philosophy. The last named degree is conferred upon any graduate in any one of the baccalaureate degrees of the university who, for at least two years after graduation, has pursued at the university or elsewhere a special course of study in any one of the following: 1, the Latin and Greek languages; 2, the French, German, and English languages; 3, mental and moral philosophy, history, and political economy; 4, mathematics and its applications; 5, the natural sciences. The professional degrees are those of civil engineer, mining engineer, and bachelor of law. Degrees are conferred after written examination, and none are conferred in course. Special privileges in the way of free tuition or a reduction of fees are extended by the board of trustees to students ranking first in certain high schools and academies, to young men intending to become practical printers, journalists, or teachers, to indigent students, to candidates for the ministry, and to sons of ministers. The faculty may admit as post-graduates to the academic departments of the university, free of charge for tuition, graduates of any college or university. These privileges do not apply to students taking professional courses. The university has a library of 12,000 volumes, full and complete mineralogical, geological, and zoölogical cabinets, and valuable philosophical and chemical apparatus. Since its reorganization in 1865, there has been an average annual attendance of about 300 students, and 20 instructors.

WASHINGTON UNIVERSITY. See Saint Louis.

WASHITA, or **Ouachita,** a river of Arkansas and Louisiana. It rises in Polk co. in western Arkansas, flows first E., receiving on the way numerous small tributaries, and thence continues first S. E., then S. W., and again S. E., to the Louisiana line, whence it flows S. till it enters the Red river about 30 m. above its mouth. Its length is about 550 m., and it is navigable for large steamers as far as Camden, 300 m. above its mouth, and for smaller steamers in time of high water to Arkadelphia, 370 m. Its principal affluents are the Saline, Bartholomew, La Fourche, and Tensas on the left bank, and the Little Missouri and Bayou d'Arbonne on the right. Below its junction with the Tensas it is called the Black river.

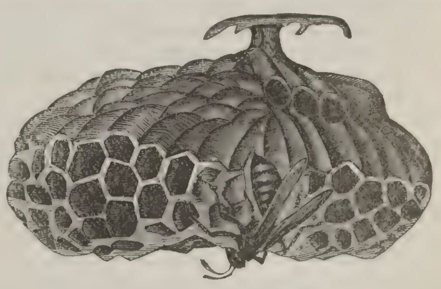
WASHITA, counties. See Ouachita.

WASHOE, a N. W. county of Nevada, bordering on California; area, 2,316 sq. m.; pop. in 1870, 3,091, of whom 221 were Chinese; in 1875, 3,953, of whom 267 were Chinese. The N. part is mostly a desert. Pyramid lake in the S. part, 33 m. long by 14 m. wide, receives the waters of Truckee river from the south, and there are several other lakes. The valleys of Washoe lake, Steamboat springs, and Truckee river form a single tract of arable and cultivated land, 30 m. long by from 3 to 6 m. wide. The mountains W. of this tract and about the head waters of the Truckee contain pine forests. N. of the river copper, gold, and silver are found, and W. of Washoe City are deposits of lead ore; but the mineral resources are limited and undeveloped. Steamboat springs, about 4 m. N. of Washoe City, are so called from the clouds of steam that constantly rise from them. The Central Pacific railroad passes along the S. border. The chief productions in 1870 were 2,874 bushels of wheat, 8,825 of oats, 17,250 of barley, 17,570 of potatoes, and 5,399 tons of hay. There were 492 horses, 2,147 cattle, 815 sheep, and 276 swine; 3 manufactories of saddlery and harness, 2 of sash, doors, and blinds, 1 silver reducing and refining establishment, 1 flour mill, 5 saw mills, and 2 quartz mills. Capital, Reno.

WASHTENAW, a S. E. county of Michigan, drained by Huron and Raisin rivers and their branches; area, 720 sq. m.; pop. in 1870, 41,434; in 1874, 38,723. It has an undulating surface, diversified by prairie and woodland, and interspersed with numerous small lakes and ponds. The soil is a rich sandy loam. It is traversed by the Michigan Central, the Michigan Southern, and other railroads. The chief productions in 1870 were 1,050,311 bushels of wheat, 874,822 of Indian corn, 418,138 of oats, 120,543 of barley, 350,409 of potatoes, 1,248,586 lbs. of butter, 18,500 of cheese, 906,011 of wool, and 76,678 tons of hay. There were 11,215 horses, 11,272 milch cows, 11,979 other cattle, 187,059 sheep, and 19,474 swine. The whole number of manufacturing establishments was 544; capital invested, $1,717,670; value of products, $3,668,462. The principal establishments were 7 manufactories of agricultural implements, 5 of boots and shoes, 32 of carriages and wagons, 36 of clothing, 30 of cooperage, 7 of furniture, 3 of printing paper, 14 of saddlery and harness, 5 of sash, doors, and blinds, 5 of woollens, 19 flour mills, 6 tanneries, 6 currying establishments, 2 planing mills, and 14 saw mills. Capital, Ann Arbor.

WASP, the common name of the hymenopterous insects of the family *vespidæ*, of which the old genus *vespa* (Linn.) is the type. They are characterized by having the upper wings folded longitudinally when at rest, forming long narrow organs on the sides of the body,

Common Wasp (Vespa vulgaris).



Nest of Polistes fuscata.

hence called *diploptera;* the tongue is moderate, the antennæ long, the jaws horny and serrated, and the eyes notched or kidney-shaped; the body is usually steel-blue with yellow markings, and the abdomen, except in the males, is armed with a long, powerful, and venomous sting; the legs have no appendages as in the bees for collecting honey; their nests or vespiaries are made either under ground, or attached to the branches of trees or the woodwork of houses. There are two groups of wasps, the social and the solitary, the common wasp of Europe (*vespa vulgaris*, Fabr.) and our hornets being good examples of the former, and our common mud wasp (*eumenes fraterna*, Say) of the latter. The social wasps live in large communities, in nests either in the ground or on trees, most of the individuals being sterile females, the neuters or workers, which in the perfect nest do most of the work as builders, soldiers, providers, and nurses; the males perform no work, though, according to the younger Huber, they keep the nest free from dirt and rubbish and carry away the bodies of those which die; the workers are winged and provided with stings, and are distinguished from the females or queens by their much smaller size. These nests rival those of the bee in ingenuity of construction; though well provided with the means of excavating a nest, they will often make use of the deserted burrow of a field mouse to save themselves the trouble of burrowing. The nest of the social ground wasps has generally an entrance gallery about an inch in diameter and several inches long in a zigzag direction, leading to a central chamber 1 to 2 ft. in diameter when finished; for details as to the internal structure and economy of such a nest, see "Proceedings of the Boston Society of Natural History," vol. vii., pp. 411–418 (November, 1860). The nest of the social tree wasp is made of paper-like material, and arranged as described under HORNET. The whole society are destroyed by cold weather, except a few young impregnated females, which pass the winter in a torpid state; each of these survivors in the ensuing spring may be seen prying into every hole in a hedge or bank to find a suitable place for a nest; having made one in the ground or on a tree, the female lays a few eggs, the larvæ from which are fed by herself alone; this first brood are all workers, which on reaching their full growth relieve the queen of all labor, and by the further deposition of eggs the colony rapidly increases; the males and perfect females do not make their appearance until the end of summer; a large nest contains 300 or 400. The larvæ are fleshy grubs, without feet and therefore helpless, and are fed daily by the workers, which prepare food for them in their stomachs; they are placed head downward in the cells, which are closed when they are about to pass into the nymph state. They do not use the same nest a second season; they are remarkably attached to their young, never deserting them or abandoning the nest. The nests of the solitary wasps are made of clay or sand, and attached to walls and palings, though a few species burrow in sandy ground; they construct several cells close together, each containing a larva and a supply of living or torpid insects for its food (see SAND WASP); in these nests there are only males and perfect females. Wasps are very voracious and omnivorous, feeding on insects, meat, fruits, honey, and other sweets; in some parts of Europe the butchers are glad to have them about their stalls for their services in keeping off the meat flies. They sting upon the slightest provocation; the wounds are very painful, and are best treated by ammoniated lotions; they are fond of attacking bees either on the wing or in their hives, one wasp being a match for three bees, and one in its reckless daring not hesitating to attack a host of the latter; they are swift and long continuing fliers. Like the bees they are infested by hymenopterous parasites, ichneumon flies of the genus *xenos* (Rossi), which deposit their tiny eggs in their bodies, the larvæ from which live between the rings on the back. A few species lay up honey like the bees; a Brazilian wasp (*myroptera scutellaris*, White) makes a brownish red honey, which when newly made has hardly any taste or odor; the honey of wasps, as of bees, is sometimes poisonous, and produces a kind of raving delirium. An English species (*V. Britannica*, Leach) suspends its fine paper-like structure from the branch of a tree, generally the silver fir. The *polistes nidulans* (Fabr.), of Brazil and Guiana, makes a nest of a beautiful, polished, white pasteboard, so solid as to defy the sun and rains of the tropics; it is suspended on the highest branches of the trees, swinging freely on the twig which passes through the upper part, and entirely beyond the reach of monkeys, which would otherwise destroy it in search of honey. In tropical regions the societies do not perish in winter, but the females emigrate to a distance and establish new colonies. Our common paper-making wasp is the *polistes fuscata* (Fabr.), of a general brown color. The common mud wasp (*E. fraterna*, Say) makes its cells of clay, plastering it against the outer or inner walls of houses; each cell contains a single egg, and a supply of living spiders for the young; other species use flies for the same purpose.—These ferocious and predatory insects are remarkable for the very slight stalk which unites the thoracic and abdominal regions. As they not only destroy bees and steal honey, but injure fruit by their gnawings, farmers are generally glad to destroy them when an opportunity offers. This may be effected by hot water, sulphurous vapors, or common smoke; or the vapor of ether or chloroform may be introduced, when the nest may be dug up or stripped from the trees, and be handled with impunity.

WATAUGA, a N. W. county of North Carolina, bordering on Tennessee, and drained by the New and Watauga rivers; area, 550 sq. m.; pop. in 1870, 5,287, of whom 226 were colored. The surface is generally mountainous; the Alleghanies form the E. boundary, Iron mountain extends along the W. border, and Yellowstone mountain occupies the S. part. The soil of the valleys is very fertile. Iron ore is found. The chief productions in 1870 were 6,160 bushels of wheat, 17,317 of rye, 75,944 of Indian corn, 18,724 of oats, 11,381 of potatoes, 50,598 lbs. of butter, 13,850 of wool, and 1,538 tons of hay. There were 812 horses, 5,088 cattle, 7,039 sheep, and 6,607 swine. Capital, Boone.

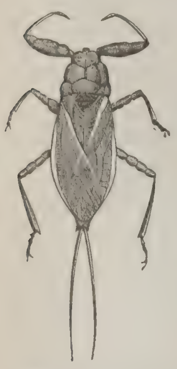
WATCH. See Clocks and Watches.

WATER, a liquid composed of oxygen and hydrogen. The earlier chemists supposed it to be an element, and it was only about a century ago that the researches of Cavendish and Lavoisier established its compound nature, which has since been abundantly verified both by analysis and by synthesis. By the action of an intense heat or by the electric current it is resolved into its constituents and yields one volume of oxygen gas and two volumes of hydrogen gas; or, as the former has 16 times the density of the latter, eight parts by weight of oxygen to one of hydrogen. These two gases when mingled in these proportions unite with explosive violence by the contact of flame, and reproduce water, the union being attended with great elevation of temperature. Pure water at ordinary temperatures is a liquid devoid of taste and smell, transparent, and nearly colorless, but when viewed in mass is found to possess a faint blue color. A cubic inch of pure water, at a temperature of 62° F. and a barometric pressure equal to 30 in. of mercury, weighs 252·458 grains troy; and for the purposes of ordinary calculation a cubic foot of water may be reckoned at 1,000 oz. avoirdupois, or 62½ lbs. In France water at its point of maximum density, or 4° C. (39·2° F.), is taken as the standard, and the weight of a cubic centimetre at this temperature, and under a pressure equal to 760 millimetres of mercury, is one gramme, which is the unit of weight in the metric system. Its density at this temperature is about 770 times that of atmospheric air, and is taken as the standard of comparison for the density of all liquid and solid bodies. Hence its specific gravity is said to be unity or 1·000. (See Gravity, Specific.) Water is slightly elastic, and by the increased pressure of one atmosphere has its volume diminished to the extent of about 0·000047, its compressibility increasing with the augmentation of temperature. The density of water below 39·2° F. is diminished by cooling, it being 0·999877 at 32° (0° C.). One hundred parts of water at 32° expand to 104·29 when heated to 212°, and to 110·16 at 314·24°. At the temperature of 32° liquid water under the ordinary conditions of pressure becomes changed into ice, with a considerable augmentation of volume. The specific gravity of ice is ·920, water at its greatest density (at 39·2°) being 1·000. The expansion of nearly $\frac{1}{11}$ which takes place in the freezing of water suffices to break very strong vessels; but when so confined that its expansion is prevented, it can be cooled to very low temperatures without losing its liquid form. Pressure thus reduces the freezing point and prevents the congelation of water, and in like manner lowers the melting point of ice. Ice is a crystalline solid which assumes the forms of the hexagonal system of crystallization, as is well seen in snow flakes. Its color when in large masses is like that of liquid water, slightly blue. Much heat is liberated in the formation of ice, so that water cooled to 32° requires a prolonged exposure to a temperature below this point for its solidification; and conversely the melting of ice is attended with a great absorption of heat. When a pound of water at 174·56° F. is mixed with a pound of ice at 32°, the latter in melting reduces the temperature of the whole to 32°. Water is volatile at all temperatures, a portion of watery vapor being given off from ice below the freezing point. As the temperature is raised, the tension of the vapor disengaged from the surface of the liquid augments, until it equals the atmospheric pressure, beyond which the liquid enters into ebullition. The boiling point of water in metallic vessels is 212° when the barometric column is 29·922 in., but varies with the pressure, so that on mountains, where the weight of the barometric column is reduced, the boiling point is proportionally lowered, while under increased pressure it is augmented. Thus, with a pressure equal to two atmospheres water boils at 260·52°; with four atmospheres, at 293·72°; with ten atmospheres, at 358·88°; and with 30 atmospheres, at 457·2, a temperature above the melting point of tin. The nature of the inner surface of the containing vessel affects somewhat the point of ebullition, so that in smooth glass or porcelain it is one or two degrees above that in a rough metallic vessel. The evaporation of water at temperatures below boiling takes place only from the surface, and in a confined space ceases after the surrounding air has become saturated with the watery vapor. The process is therefore accelerated by a free circulation, which removes the saturated atmosphere. Water boiling at the ordinary pressure is converted into more than 1,600 times its volume of vapor, which at the temperature of ebullition (212° F.) has a specific gravity of 0·622 as compared with air at that temperature, or of 0·455 as compared with air at 32°. The conversion of water into vapor is attended with absorption of heat. One pound of water at 212°, in becoming vapor of the same temperature, consumes as much heat as would raise 5·37 lbs. of water from 32° to 212°; hence one pound of steam, at 212°, will raise 5·37 lbs. of water to 212°, being itself condensed, so that the result is 6·37 lbs. of water of 212°. Aqueous vapor is colorless and transparent, and only becomes visible in the air when partially condensed, as in the case of escaping steam. Watery vapor is precipitated from air upon cold surfaces in the form of dew, but occasionally also as hoar frost, thus changing from gas to solid without passing through the intermediate condition of liquidity. At the heat of melting platinum it is separated into its constituent gases.—Water is widely distributed in nature: in the form of ice and snow in the polar regions, in the condition of aqueous vapor, which forms a constant ingredient in the atmosphere, and in the liquid form not only in oceans, lakes, and rivers, but permeating the soil and most of the known rocks. It is the predominant element in the sap and juices of plants, and in the blood and flesh fluids of animals, and constitutes about five sixths of the weight of the human body. Water, or at least the elements of which it consists, hydrogen and oxygen, moreover exist in a great many bodies in such a state of combination that these are generally described as compounds of water, and are known as hydrates. Thus gypsum when exposed to heat gives off 20 per cent. of water, which it will again absorb if brought in contact with it at ordinary temperatures. Serpentine rock contains 12 per cent., brown iron ore 15 per cent., and alum 45 per cent. From all of these bodies it is given off by heat. Some of these hydrates retain the water much more strongly than others, and it is a question with chemists whether the water is to be regarded as existing ready formed in these and similar compounds. Besides, there are numerous bodies, such as starch, sugar, and woody fibre, which are often spoken of as hydrates of carbon, and may be represented as compounds of carbon with water. But they are rather to be looked upon as triple compounds of carbon, hydrogen, and oxygen, in which water as such does not exist; and in philosophical exactness, the same view should be extended to the mineral hydrates just mentioned.—Water is remarkable for its solvent power, by which we understand its capacity to unite with or take up into itself various solid, liquid, and gaseous matters, forming with them homogeneous liquid compounds called solutions. Familiar examples of this are seen in its action on salt and sugar. Different bodies have very different degrees of solubility, and many are soluble in water to so slight an extent that they are generally classed as insoluble. Thus, while one part of common salt requires about three parts by weight of water to dissolve it, one part of gypsum requires about 400 parts, and one part of carbonate of lime under ordinary conditions 10,000 parts of water; while sulphate of baryta is very much less soluble, and for all practical purposes may be regarded as insoluble in pure water, though somewhat soluble in saline solutions. Certain bodies, such as the metals, resins, carbon, sulphur, and oils, are regarded as wholly insoluble; but all of these bodies form chemical compounds which are soluble in water. With regard to a great many substances it is known that they occur in two conditions, the one soluble and the other insoluble. Thus silica, which in the form of flint or quartz appears wholly insoluble in water, not only forms a soluble compound with the alkalies, the so-called soluble glass, but when separated from this compound is itself soluble in water to the extent of 14 per cent. In like manner the sesquioxides of iron, chrome, and aluminum, though completely insoluble in water in their ordinary artificial forms, and constituting moreover some of the most insoluble minerals in nature, may be by chemical means obtained in eminently soluble forms. In a great many other cases it can be shown that bodies when generated in the presence of water by chemical reactions are soluble for a time, though when they have once passed into insoluble forms it is not easy to restore the condition of solubility. Solution is a process of condensation, in which the volume of the body dissolving is more or less completely lost in that of the solvent. Hence pressure, which favors condensation, augments the solvent power of water; experiments have shown that the solubility of certain salts in water is notably increased under a pressure of many atmospheres. Heat exercises an important influence on the solvent power of water; thus, while gypsum and lime are much more soluble in cold than in hot water, and sea salt has about the same solubility in both, the greater number of salts are much more soluble in hot than in cold water. Some bodies nearly insoluble in cold water possess a considerable degree of solubility at 212°, while others apparently insoluble at this point enter into solution in water when heated under pressure to temperatures considerably higher. The presence of carbonic acid, which is found in most natural waters, greatly augments the solvent power of this liquid for many substances. As a result of this wide range of solubilites, it follows that pure water, except as an artificial product, is unknown, and that all natural waters have their characters modified by the presence of foreign matters. That which falls from the clouds as rain or snow water holds in solution, besides the gases nitrogen, oxygen, and carbonic acid dissolved from the atmosphere, small portions of ammonia and nitrous compounds, and a minute but variable amount of mineral matters which were previously suspended in the air. After falling on the earth these same waters become further impregnated with foreign ingredients. From decaying vegetation they take up two classes of substances: first, the organic products of decomposition, the so-called soluble organic matters, which give to the waters of marshy districts their brownish color; and second, the mineral matters which form an essential part of all vegetation and constitute its ash, but are for the most part liberated in soluble forms during its slow decay. These consist chiefly of salts of potash, lime, and magnesia, with phosphates and silica. At the same time the free oxygen of the atmospheric waters is absorbed by the organic matter and replaced by carbonic acid derived therefrom. In rivers and waters exposed to the further action of the air, oxygen is again absorbed, and a slow oxidation of the dissolved organic matters is effected. When the atmospheric waters sink into the soil, either directly or after being thus impregnated with the products of organic decay, they undergo still further changes, dependent upon the nature of the strata through which they pass. Ordinary soils contain no matters soluble in pure water, yet they are not without action on the infiltrating waters whose composition has just been described, especially if the soils are more or less clayey. In this case the silica and phosphates, together with much of the organic matter, are retained, while the potash salts are exchanged for those of soda and of lime. Carbonates of lime and magnesia, when present in the soil, are moreover taken into solution by the carbonic acid present. Hence the ordinary waters of wells and springs, supplied by this filtration, differ very much in their composition from the superficial waters. These reactions, in virtue of which the foreign matters derived by the superficial waters from the decay of plants are absorbed by the soil, are important alike for the nutrition of subsequent generations of plants and for the purification of the waters, which are thus rendered potable. Besides these reactions, which depend upon the mineral matters previously dissolved by the atmospheric waters, there are others not less important due to the direct action of the water and its dissolved gases on the solid rocks, in virtue of which the silicated minerals of these are decomposed with the liberation in a soluble form of certain of their elements. In this way large quantities of alkalies, lime, and magnesia are set free and are dissolved in the form of carbonates, together with a considerable proportion of silica, which is liberated in a soluble condition. This process of decay has been going on from remote ages, and has effected the decomposition and disintegration of vast portions of the crystalline rocks, which have thereby been reduced to the condition of clays, while immense amounts of soluble matter have been added to the waters of the earth. The rivers which drain regions of crystalline rocks are, as a result of this process, remarkable for containing in solution carbonates of soda and potash, together with a large relative proportion of silica, as may be seen in the waters of the Ottawa, the Loire, and the Garonne. Waters of a like origin are deprived by filtration through the soil of their silica and potash. A process similar in its results probably takes place at great depths under the influence of carbonic acid from subterranean sources, from which result waters more highly impregnated with alkaline salts, constituting some of the best known mineral springs. In addition to these various impregnating matters should be noticed those derived from the oxidation of metallic sulphurets, chiefly pyrites, giving rise to sulphates of iron and alumina, and indirectly to sulphates of lime and magnesia. Another and an important supply of foreign matters is derived from the soluble salts, such as chlorides and sulphates, which are enclosed in many stratified rocks, while the carbonates of lime and magnesia of these rocks are themselves dissolved by carbonic acid, and with the iron oxide taken into solution through the intervention of the organic matters contribute to the complex constitution of the water of springs, rivers, and lakes. The quality called hardness in such waters depends upon the power they possess of decomposing soap, and is due to the salts of lime and magnesia, whether present as carbonates or in the form of sulphates and chlorides. Boiling, by expelling the excess of carbonic acid, precipitates the carbonates in an insoluble condition, and thus gives rise to incrustations. The sulphate of lime, from its sparing solubility at elevated temperatures, is deposited in like manner in high-pressure boilers.—The ocean is the great receptacle of all soluble matters from the land, and from its waters have been deposited the greater part of the stratified rocks of the earth's crust. The waters of the ocean vary somewhat in composition, but contain on an average about 34 parts of solid matter in 1,000, though in the Mediterranean, where evaporation is rapid, this rises to 36 or even 40 parts, and in other regions falls very much lower, owing to the admixture of fresh water from the land. The saline matters of the sea may be regarded as consisting of from 78 to 80 per cent. of chloride of sodium or sea salt, with 2 per cent. of chloride of potassium, 7 or 8 per cent. of chloride of magnesium, about 7 per cent. of sulphate of magnesia, and from 3 to 4 per cent. of sulphate of lime. A different arrangement of these elements in the water is conceivable, and is even probable; but when exposed to spontaneous evaporation, as in the manufacture of salt, the whole of the lime separates as gypsum or hydrated sulphate of lime, after which the sea salt is in great part deposited in a pure state, followed by a mixture of it with sulphate of magnesia, until there remains in the dense solution or bittern little more than chloride of magnesium. In addition to the above named compounds, the sea water contains in the form of bromides an amount of bromine equal to about $\frac{3}{10.000}$ of its weight, besides appreciable quantities of iodine, fluorine, phosphates, and borates. Moreover, it holds in solution a small and variable amount of carbonate of lime, some silica, and traces of various metals, including, besides iron and manganese, arsenic, copper, lead, silver, and gold. It may in fact be expected that the sea will contain all the mineral elements which are capable of being held in solution in its waters, so that the progress of chemical investigation may greatly add to the preceding list. The waters of the ocean are subject to constant changes from several different causes which have been active from remote ages, first among which may be placed the action of the alkaline waters, the origin of which has already been described, and which sooner or later find their way to the ocean. These, by the carbonate of soda which they contain, decompose the lime salts in the sea water, generating carbonate of lime and soda salts, of which the former remains in solution until it is taken up by growing plants and animals, including the coccoliths and nullipores among the former, and the foraminifera, radiates, and mollusca among the latter, from the remains of all which organisms the limestones are at last built up. To this, however, the carbonate of lime directly brought down from the land contributes, and also the carbonate of magnesia, which reacts upon the lime salts in the sea water precisely like carbonate of soda, giving rise by double decomposition to carbonate of lime. The water of the ocean in early times contained a large proportion of chloride of calcium, which in the course of ages has been decomposed with the formation of carbonate of lime and chloride of sodium, until at present the lime in the sea water is insufficient to form gypsum with more than a small proportion of the sulphate. The ultimate result of this process will be the elimination from the ocean's waters of the whole of its soluble lime salt, and its replacement by salts of soda and of magnesia. In these changes in the ocean waters it is evident that the intervention of vegetable and animal life in the formation of limestone is but incidental, since the insolubility of the chemically formed carbonate of lime would eventually lead to its separation in a solid form, independent of organic beings. But there are other changes in the composition of the ocean's waters which are directly dependent upon the agency of life. The ash of marine plants, like that of those of the land, contains large quantities of potash salts and phosphates which have been abstracted from the waters of the sea, besides portions of iodine and of the rarer metals. These same elements are not confined to plants, but enter into the composition of the marine animals. The phosphate of lime of the sea weeds passes into the bones of fishes; copper is found in the fluids of certain mollusks and crustaceans, and iodine is concentrated in sponges as well as in sea weeds. Thus these various elements pass from the waters into animal and vegetable tissues, by the decay of which on land or in the ooze at the bottom of the sea they become fixed in insoluble forms, being thus removed from the oceanic circulation and restored to the solid earth. Through these reactions the sea has doubtless suffered great modifications in composition, and but for them its waters would become charged with phosphates and the various mineral matters mentioned above. The composition of the waters of the sea in past ages has also been profoundly modified by evaporation and by processes connected therewith. So long as the waters of the open ocean receive again the whole amount of water raised by evaporation, the only change which can result from this process is that already explained as effected by the soluble matters brought down from the land; but the results are very different in the case of basins cut off from the ocean, like the Dead sea, which is a type of a vast number of much larger areas existing in former geological periods under similar climatic conditions. These conditions are, an amount of evaporation exceeding the rainfall of the enclosed sea and its geographical basin, from which results a gradual diminution of the volume of water and its consequent concentration, causing the precipitation from the water of beds of sulphate of lime or gypsum and of rock salt, often of great thickness and extent, and more rarely of soluble salts of potash and magnesia, the results of a still further evaporation, all of which are today found imbedded in the rocky strata of past geological ages, and represent large amounts of saline matter removed from the ocean's waters. Into these restricted and cut-off basins, moreover, the limited rainfall brings the soluble salts from the land, which by their reaction on the salts of the sea water effect, in addition to the changes already described, others peculiar and not less remarkable. These waters generally contain, as already explained, carbonates of lime, soda, and magnesia, of which the latter two decompose the chloride of calcium and the sulphate of lime present, with separation of carbonate of lime, until at length the whole of these more soluble lime salts are converted into carbonate. Then begins a reaction between the carbonate of soda and the soluble magnesian salts of the sea water, resulting in the production of carbonate of magnesia. Another and very different reaction gives rise to the same compound in waters which have lost their soluble lime salts either by the reaction just mentioned or by its separation in the form of gypsum. The carbonate of lime in the inflowing waters, which hold it as bicarbonate, yields by double decomposition with the sulphate of magnesia of the sea water sulphate of lime and bicarbonate of magnesia, the former of which salts, being very sparingly soluble, readily separates as gypsum, leaving the more soluble magnesian bicarbonate to be thrown down at a later period in the process of evaporation, in the condition of simple carbonate. From this, with the addition of carbonates of lime and magnesia brought by the inflowing waters, are formed the dolomites or magnesian limestones which abound in the rock formations of various geological periods, and appear to have been in all cases deposited in evaporating basins. By virtue of the last described reaction, as will be seen, both of the constituents of the sulphate of magnesia are completely removed from the evaporating waters and fixed in insoluble forms, thus permanently modifying the composition of the water of enclosed basins, which by subsequent changes of sea and land become once more a part of the ocean, affecting the composition of its waters. In many cases the river or spring water flowing into closed basins contains neutral salts of lime and magnesia, so that we find in such lakes great variations in composition, from the bitter salines of the Dead sea, charged with chlorides of magnesium and calcium, to the alkaline waters containing carbonate and borate of soda which abound in central Asia, Egypt, and California.—The various stratified rocks, whether of mechanical or of chemical origin, have for the most part been deposited in the waters of the open sea or of enclosed basins. All of these rocks are more or less porous, and over great areas which have never been subjected to any considerable disturbance they are still impregnated with the saline waters in the midst of which they were deposited. Leaving out of question the solid soluble salts enclosed in these strata, some notion of the amount of saline water which they contain may be had from a consideration of the degree of porosity of various rocks. Careful experiments upon the different rocks of the great American palæozoic basin show that various sandstones are capable of holding in their pores from 2 or 3 up to 10 and 20 volumes of water for 100 of rock, while the pure limestones generally hold not more than 1 or 2, and the dolomites from 5 to 10. The porosity of many rocks is even greater than any of these, and from a comparison of the above observations with others made in Europe, it is probably not an exaggeration to say that the stratified sedimentary rocks as a whole contain in their pores one tenth of their volume of water; so that the 40,000 or 50,000 ft. of palæozoic strata in parts of North America and Great Britain would hold enclosed the equivalent of seas of nearly a mile in depth, and the volume of water enclosed in the rocky strata of the earth's crust bears a very considerable proportion to that of the ocean. Many of the deposits of later times, it is true, are of fresh-water origin, and the older strata in regions where they have been much broken and disturbed have had their saline waters replaced by fresh waters from the atmosphere. Over very large areas, however, such strata are found to contain saline waters differing from those of the present ocean, and representing the ancient sea waters. Such an area is that of the great palæozoic basin of the United States, including the valleys of the Mississippi, the Ohio, and the St. Lawrence, which by the evidence of numerous artesian wells and springs are shown to include saline waters with a predominance of salts of lime and magnesia such as should belong to the earlier sea, and by their great density, in many cases much exceeding that of the present ocean, indicate the former presence of partially dried-up seas, which is further shown by the interstratified deposits of rock salt at more than one geological horizon. These subterranean oceans are the source of the various saline mineral waters, in which however the ancient sea waters are found very much diluted or modified by the admixture of waters from superficial sources, or of the alkaline waters already mentioned.—By common usage the name of mineral waters is given to such as from the proportion or the nature of their mineral ingredients are unfitted for the ordinary uses of life. They may be divided into several classes, of which the following are the most important: 1, those approaching sea water in composition, though more or less diluted, and holding variable proportions of salts of lime and magnesia; 2, waters holding chiefly carbonate of soda with variable proportions of carbonates of lime and magnesia. Between these two types are a large number of intermediate waters, such as would result from their intermingling, and presenting various gradations; the most marked being those which are at once alkaline and saline, like the springs of Saratoga, while the first type is represented by the bitter saline of St. Catharines, Ontario, and the second type by waters like Vichy and Carlsbad. In very many of these saline and alkaline waters are found small portions of the rarer elements, such as lithium, cæsium, rubidium, strontium, and barium, with salts of iron, and occasionally arsenic, antimony, copper, lead, and many other metals in traces. The presence of phosphates, borates, and fluorides is also very frequent, and compounds of bromine and iodine are supposed to contribute very much to the value of certain mineral waters. Besides these principal groups of saline and alkaline waters should be mentioned those which contain sulphates of aluminum and of iron, as the so-called alum springs, and others in which free sulphuric acid is the chief ingredient, as the acid springs of New York and Ontario. A sulphurous impregnation may belong to any of the classes noticed, and may be due either to the presence of free sulphide of hydrogen or to a soluble metallic sulphide.

These various sulphides result from the reducing action of organic matters on sulphates, and the most strongly sulphuretted waters are generally gypseous and but feebly saline. An excess of carbonic acid is also frequently met with in saline and in alkaline waters, which are sometimes so highly charged with it as to be acidulous to the taste and sparkling, as is the case of the Saratoga waters. It seems however to be an accidental ingredient, absorbed by the waters at considerable depths under pressure, and is wanting in the greater number of these saline springs. Waters coming from considerable depths in the earth are found to have a more or less elevated temperature, and are designated thermal waters, a name which properly belongs to all such as are warmer than the mean annual surface temperature of the locality. The temperature of the solid crust of the earth increases on an average about 1° F. for each 60 ft. in depth, as has been shown in the water from deep artesian wells, and it is hence concluded that the waters of hot springs come from very considerable depths. Those of Virginia and of Arkansas are well known, but those of the Yellowstone park are still more remarkable. Numerous springs of this region have temperatures varying from 160° to 200° F., a point above that of the ebullition of water in this elevated region. Hence the hotter of these waters on coming to the surface disengage vapor with explosive violence, giving rise to the phenomenon of geysers. These, like many other hot springs, hold in solution large quantities of silica, which they deposit at the surface, a fact which has been observed in similar waters in Nevada and in Iceland. The geological significance of such waters is very great, inasmuch as they give us some notion of the potent agencies which are at work in the deeper portions of the earth's crust, where the solvent action of the waters, exalted by heat and by pressure, is exerted upon alkaliferous rocks, giving rise to solutions which in their turn possess solvent powers far greater than those of pure water. Various experiments by recent investigators throw light on these actions of heated water and watery solutions. Thus it has been found that sulphate of baryta, when heated and cooled in presence of solutions of alkaline bicarbonates under pressure, is dissolved and redeposited in a crystalline form. Silica under similar conditions dissolves and crystallizes again in the form of quartz, and various metallic sulphurets have in like manner been obtained in crystalline forms, like those found in nature, and by reactions between their constituent materials, crystalline feldspar, mica, and pyroxene have been produced. While these reactions take place rapidly at temperatures considerably above the boiling point of water, and in fact approaching a red heat, other observations have shown that very similar processes, resulting in the production of many of these mineral species, may take place more slowly at temperatures much lower. Examinations of the baths at Plombières, Luxeuil, and Bourbonne-les-Bains in France have shown in the old constructions, which date from the Romans, the occurrence of crystalline calcite, fluor spar, and various silicates belonging to the class of zeolites, which have been generated by the long continued action of alkaline waters at temperatures from 140° to 160° F. upon the bricks and mortar; while coins and medals have given rise to well crystallized metallic sulphurets of various species identical in form and in composition with those met with in mineral veins. These observations throw great light on the phenomena of metalliferous veins, in which all the various minerals named, together with many more, are met with, arranged in such a manner as to show that they have been deposited as incrustations on the walls of fissures, which doubtless served as channels for the passage of heated waters. These, ascending toward the surface, where a diminished pressure exists, have yielded up in crystalline forms their dissolved materials, thus in time filling up the fissures with a veinstone often charged with metallic ores. It has been shown that the hot springs in Nevada are even at the present time depositing silicious matters mingled with metallic sulphurets. A comparison between such lodes as those just described, in which the veinstone may be carbonate of lime, sulphate of baryta, or quartz, occasionally with silicates like mica and feldspar, and granitic veins, which are essentially composed of these latter mineral species with quartz, leads to the conclusion that these veins have been formed in a similar manner, and in fact that the elements of those granites which occur in veins have in like manner been at one time in solution. It is difficult to draw the line between these and the larger masses of granitic rocks, in the production of which water has doubtless intervened under conditions of which we have but an imperfect conception. The crystals of quartz and of various other minerals in granites are found to contain minute cavities wholly or partially filled with water, often holding saline matters in solution; and it is supposed that in the case of eruptive granites, as in lavas, water has played an important part in giving liquidity to the rock. (See GEOLOGY, GRANITE, and VOLCANO.)—For the natural history of water, see Bischof, *Lehrbuch der chemischen und physikalischen Geologie* (2 vols., 1847–'54; English translation, 1854–'9); Lersch, *Hydrochemie* (Berlin, 1864); and Hunt, "Chemical and Geological Essays" (Boston, 1875).

WATER BUG, the popular name of the hemipterous insects of the suborder *heteroptera*, and families *notonectida* and *neparia*. In this suborder the anterior portion of the first pair of wings is of a horny consistence; the antennæ are very small, of three or four short joints, and concealed beneath the eyes. In the *notonectida* the head is rounded, and as wide as the thorax; the common boat flies of America and

Europe (*notonecta Americana*, Fabr., and *glauca*, Linn.) swim very rapidly by means of the flattened, oar-like hind legs, and with the back downward; the air for respiration is carried in the space between the wings and back; they are active and predaceous, feeding on aquatic insects and larvæ, and may be seen in almost any piece of fresh water; the color is grayish brown, and the length about three fourths of an inch; they are carnivorous at all ages. In the other family the head is small and triangular, and the legs not so well adapted for swimming, the anterior pair being modified into powerful prehensile organs. The genus *nepa* (Linn.), or water scorpion, includes some insects 2 or 3 in. long; the common species, *N. apiculata* (Harris), of America, and the *N. cinerea* (Linn.) of Europe, are about two thirds of an inch long, and brownish gray; respiration is effected through two long filaments extending from the caudal extremity; they are voracious and carnivorous, and fly chiefly at night.—For the *hydrocanthari* or water beetles, see BEETLE.



Water Scorpion (Nepa cinerea).

WATERBURY, a town and city of New Haven co., Connecticut, on the Naugatuck river and railroad, at the W. terminus of the Hartford, Providence, and Fishkill railroad, 75 m. N. E. of New York and 33 m. by rail S. W. of Hartford; pop. of the town in 1850, 5,137; in 1860, 10,004; in 1870, 13,106, and of the city, 10,826. The city is on the E. bank of the river, and is surrounded by hills. It has many fine residences, excellent water works, and a good fire department, and is lighted with gas. Near the centre is a public park finely laid out, and on the W. bank opposite lies the handsome Riverside cemetery, containing 40 acres. The city hall is a fine structure. Adjoining it is the Bronson free library, endowed by Silas Bronson with $200,000; it contains more than 18,000 volumes. St. John's church (Episcopal) and the first Congregational church are handsome buildings. Waterbury is celebrated for the extent and variety of its manufactures. The manufacture of gilt buttons was begun in 1802, and after the war of 1812 the rolling of brass and copper and the production of brass and copper wire were introduced; and Waterbury is now the centre of the brass industry of the country. There are six rolling mills, each having a capital of from $200,000 to $400,000; two clock companies, a large suspender and webbing factory, and one of the most extensive pin factories in the country. Altogether there are about 30 joint-stock companies, with an aggregate capital of $6,000,000. More than 4,000 operatives, chiefly males, are employed, and the monthly wages amount to $175,000. About 3,000 tons of raw copper are annually consumed in the production of rolled copper and brass, brass and copper wire, tubing, German silver, plate brass, hooks and eyes, &c. The factories are very fine buildings. The city contains two national banks and two savings institutions. The public schools, including a high school, are attended by 3,000 pupils. There are also three academies. A daily and two weekly newspapers are published. There are seven churches: Baptist, Congregational (2), Episcopal, Methodist, Roman Catholic, and Universalist. The town was settled in 1667, and called Mattatuck till 1686. The city was incorporated in 1853.

WATER-COLOR PAINTING. In nearly all the methods of painting known to the ancients, water was employed as the vehicle, either alone or mixed with some glutinous substance serving to bind the colors together. Paintings in distemper, frescoes, and miniatures are all varieties of water-color paintings; but the term is now applied almost exclusively to painting on paper with colors diluted with water. The best Italian, Dutch, and Flemish painters often executed their cartoons and finished sketches with water colors; but these were mere studies, and pictures in water colors on paper, intended for exhibition as completed works of art, are much more modern. They were at first executed exclusively with solid opaque colors, and the use of transparent colors first became general toward the end of the last century. The name of "stained drawings" was at first given to paintings in this latter style; and the drawing was in general made out in light and shadow with India ink or some neutral tint, and washes of transparent colors were then applied to the different parts. The plan now generally pursued is to paint in every object at once in its proper colors, without the use of a preparatory monotinted ground, trusting to subsequent modifications, commonly made with transparent, though sometimes with opaque colors, to remove the first crude effects. The superior facility of painting in this manner, as well as of rapidly sketching evanescent atmospheric appearances, has greatly tended to popularize the art. The number of water-color painters is now very large, especially in England, the United States, and France; and in Great Britain there are special societies of painters in water colors.—The practical details of the art vary so much with different artists, that scarcely any general rules can be laid down. Some prefer a paper with a fine grain, and others with an exceedingly rough one. The paper most generally used is that known as imperial, which comprises a great variety of textures and thicknesses. Graduated tinted papers are also employed, having preparatory hues for different hours of the day or for the production of other effects. If the surface of the paper is at all greasy, so that the colors do not adhere well, it should be sponged over, or the colors may be mixed with water to which a little ox gall has been added. A peculiar texture is sometimes imparted to parts of the paper by rubbing, sponging, &c., and some of the finest landscape effects are thus produced. The colors employed, except gamboge and sap colors, do not differ from those used in oil painting (see PAINTS), and are either made into hard cakes with gum, or used "moist," or prepared with honey or some saccharine material. Moist colors are generally also made into cakes, though they are sometimes brought to a semi-fluid consistence and enclosed in thin leaden tubes, from which they may be squeezed out in small quantities as needed. Colors so prepared are chiefly used for large works or when a considerable body of color must be laid on in a short time. The mixing of Chinese white with the pigments so as to render them opaque (a practice strongly advocated by Ruskin) constitutes body-color painting, as opposed to transparent-color painting. The principal colors are ultramarine, indigo, Antwerp and cobalt blues, gamboge, ochre, Indian and chrome yellows, Indian red, vermilion, lake, carmine, burnt ochre, and brown pink reds. Out of these primary colors all the others may be compounded ; but sap green and several browns, as raw and burnt sienna, Vandyke brown, umber, sepia, &c., may also be used. They are generally mixed with water alone, but gum and other substances are sometimes added to give depth to the shadows and brilliancy to the lights. Brown sable brushes are generally used.

WATER CRESS, a plant (*nasturtium officinale*) of the *cruciferæ* or mustard family. The generic name has become the common name of a plant of a different family. (See NASTURTIUM.) It is a smooth perennial aquatic, with much branched, creeping or floating stems, which root freely at the joints; the pinnate leaves have 3 to 11 roundish or oblong leaflets; the white flowers, which appear all summer, are in short racemes, and succeeded by pods half an inch or more long, slightly curved upward, containing two distinct rows of turgid, wingless seeds. The plant is a native of northern Europe and Russian Asia. The leaves and young shoots have a pleasant pungency, and are generally esteemed as a salad, being eaten simply with salt, or added to lettuce and other salads and dressed with oil and vinegar. In many localities the plant grows spontaneously in brooks and ditches, but it is largely cultivated for market, and is a very profitable crop. A clear stream with a gravelly bottom is desirable; this is often made to cover a large area by preparing beds at the sides and directing the water into them by means of partial dams. The beds are stocked by sowing seeds, or most generally by setting fragments of the plants; the crop should not be pulled, but cut, as the portion left soon throws out new and tender shoots, allowing several successive cuttings to be made. There are but few varieties; the brown-leaved is thought to have a larger proportion of foliage to the stems, and a new variety, the sweet Erfurt, which has yellowish green foliage, is regarded in Europe as the best flavored. Those who have no brook may cultivate the water cress in a tub, and it may be had at all seasons by planting cuttings in broad pots, set in pans of water, in a cool greenhouse. The winter cress (*Barbarea præcox*) has been cultivated, and has become naturalized in Pennsylvania and southward; it is sometimes sold for water cress, but it has a bitter and much less agreeable taste.

WATEREE, a river of South Carolina, formed by the junction of the Catawba river and Fishing creek, the former rising in North Carolina, and the latter in York co., S. C. The two streams unite in the S. E. part of Chester co., and the Wateree takes first a S. E. and then a S. course, and unites with the Congaree in the S. E. extremity of Richland co., the two forming the Santee. Steamboats ascend the Wateree to Camden, 200 m. from the sea.

WATERFORD. I. A S. county of Ireland, in the province of Munster, bordering on Cork, Tipperary, Kilkenny, and Wexford counties, Waterford harbor, and St. George's channel; area, 713 sq. m.; pop. in 1871, 122,825. The coast is in general bold and rocky, but has four good harbors, Waterford at the east and Youghal at the west, and Dungarvan harbor and Tramore bay between them. The surface is mountainous, the Knockmealdown ridge and the Cummeragh or Monavullagh mountains occupying the greater portion. Copper mines are worked; there are also lead and iron mines (not now worked), potters' clay, and marble. The county is drained by the Suir, navigable for large vessels to Waterford, and for boats to Carrick-on-Suir; and by the Blackwater, navigable for small vessels. The principal staples are butter and bacon. There are extensive fisheries, employing about 1,100 men and boys. **II.** A city, capital of the county, 83 m. S. S. W. of Dublin, with which, as well as with Limerick and Cork, it is connected by rail; pop. in 1871, 23,349. It is on the right bank of the river Suir, 9 m. above its entrance into Waterford harbor, and has an extensive suburb (Ferrybank) on the left bank. There are two parish churches, a Roman Catholic cathedral and college, an exchange, custom house, theatre, &c. The quay, the finest in Ireland, extends three fourths of a mile along the river, with a general width of 40 yards, and has sufficient depth of water for vessels of 800 tons. The exports, chiefly to England, are agricultural and dairy products, cattle, sheep, and pigs.—The town was probably founded about 850, when Sithric the Dane made it his capital. At the lower end of the quay is a Danish tower erected by Reginald, son of Imar, in 1003. In 1171 Strongbow, earl of Pembroke, and Raymond le Gros took Waterford and put to death most of the Danish inhabitants. King John gave it its first charter, and resided here for some time. The town was unsuccessfully besieged by Cromwell, but afterward was captured by Ireton. There are remains of the old fortifications and relics of ancient monasteries. Curraghmore, the seat of the marquis of Waterford, containing 4,000 acres, is near the city.

WATERFORD, a town and village of Saratoga co., New York, at the junction of the Hudson and Mohawk rivers, and on the Rensselaer and Saratoga railroad, 10 m. N. by E. of Albany; pop. of the town in 1870, 3,631; of the village, 3,071; of the town in 1875, 4,392. The Hudson is navigable by tugs and barges to this point. The Champlain canal passes through the village, where are a weigh lock and locks for passing boats into the Hudson. Horse cars run to Troy, 3 m. distant. The falls of the Mohawk furnish water power, which is made available by a hydraulic canal ½ m. long, constructed in 1828–'9. The chief establishments are an iron foundery, boiler shop, two stock and die factories, two machine shops, nut factory, valve factory, hay-press factory, paper mill, two straw board mills, two lampblack factories, cement sewer-pipe works, sash and blind factory, veneer sawing mill, flouring mill, soap and candle factory, three knitting mills, and a fire engine factory. Several of these are among the oldest of the kind in the country. There are a bank, three public school houses, a weekly newspaper, and five churches.—The village was laid out in 1784 under the name of Halfmoon Point, and was incorporated under its present name in 1801. The town was set off from the town of Halfmoon in 1816.

WATERHOUSE, Alfred, an English architect, born in Liverpool in 1830. He completed his studies in Italy, and in 1859 became known by his Gothic assize building in Manchester, to which he added the county prison in the Romanesque style. His subsequent works include the new Balliol college at Oxford, the Caius and Pembroke colleges at Cambridge, and the new town hall of Manchester.

WATERHOUSE, Benjamin, an American physician, born in Newport, R. I., March 4, 1754, died in Cambridge, Mass., Oct. 2, 1846. He studied in London, Edinburgh, and Leyden, where he took the degree of M. D., and began practice at Newport. In 1783 he became professor of the theory and practice of physic at Cambridge, where he also promoted the study of natural history, botany, and mineralogy; from 1812 to 1825 he was medical supervisor of the military posts in New England. In 1799 Dr. Jenner communicated to him his discovery of vaccination, and Dr. Waterhouse at once tested it in his own family. He wrote much for political newspapers, and published "The Botanist" (1811), and an "Essay on Junius and his Letters" (1831), attributing the letters to Lord Chatham.

WATERLAND, Daniel, an English theologian, born at Wasely or Walsely, Lincolnshire, Feb. 14, 1683, died in London, Dec. 23, 1740. He was educated at Cambridge, was appointed chaplain to George I. in 1714, and was vicar of Twickenham, canon of Windsor, and archdeacon of Middlesex. He was distinguished as a Trinitarian controversialist. His chief works are: "Eight Sermons, &c., in Defence of the Divinity of our Lord Jesus Christ" (1720); "A Critical History of the Athanasian Creed" (1724); "Scripture Vindicated" (1730), a reply to Tindal's "Christianity as old as the Creation;" and "A Review of the Doctrine of the Eucharist" (1737). A complete edition of his works, with a biography, was published by Bishop Van Mildert (11 vols. 8vo, Oxford, 1823–'8).

WATER LILY, a name for aquatic plants of several distinct genera. The later botanists confirm the popular classification, in including them all under one family, the *nymphæaceæ*, or water lily family, which is far removed from the lily family proper, as that consists of endogenous plants, while these are exogens. The family as at present arranged includes eight genera, which were formerly placed in three families; they have submerged rootstocks, from which, in those popularly known as water lilies, arise long-petioled leaves and scapes bearing large, solitary, and generally showy flowers; both leaves and flowers usually float, but are sometimes emersed (*i. e.*, project above the water); the fruit in some matures above, and in others beneath the water. The most common native water lily is the yellow, *nuphar advena*, also called yellow pond lily and spatterdock; this is found far north in Canada, extending to Sitka, and southward to Florida and Texas, in still or stagnant water. The genus *nuphar* (from Gr. νοῦφαρ, the ancient name) is regarded by some botanists as including but two species, one belonging to the old and the other to the new world, while our authors admit three as belonging to North America. The leaves are floating or emersed and erect, with stout petioles; the flowers, produced all summer, are on fleshy stalks, and not showy, being of a dull yellow color, sometimes tinged with purple or greenish on the outside; the calyx, of five or six sepals, is very large, and is usually taken for the corolla; but the true petals are numerous small thick

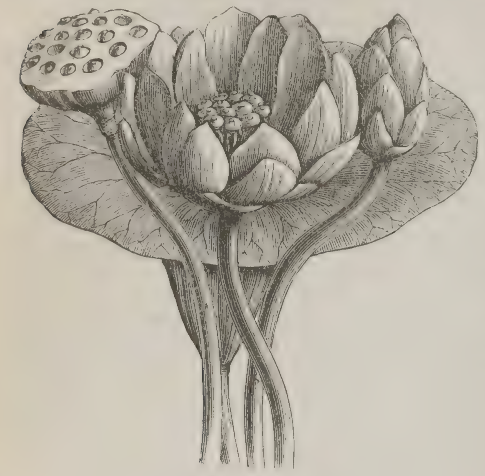
Yellow Pond Lily (Nuphar advena).

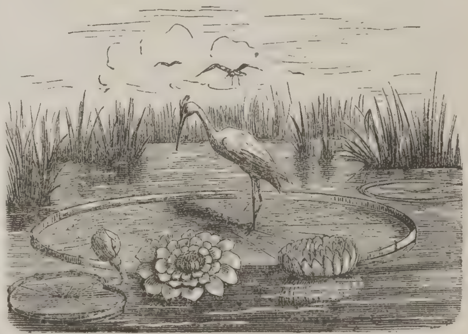
bodies, which appear much like the many short stamens next to which they are placed; the large columnar ovary is truncate at the top, crowned by the disk-like, many-rayed stigma, and has 10 to 25 cells, with numerous ovules in each cell; it usually ripens above water, becoming fleshy. The common species, *N. advena*, has six sepals, while the less common *N. lutea* has five, with its early leaves submersed and very thin, the floating ones oval; this is common in Europe, where its different forms have been named as species, and a small variety of it (var. *pumila*) is more common in this country than the type. A southern species, *N. sagittæfolia*, has arrow-shaped leaves a foot long and only 2 in. wide.

Sweet-scented Water Lily (Nymphæa odorata).

Stamens and Petals of Nymphæa.

—The plant known especially in this country as the water lily, frequently as pond lily, and sometimes as water nymph, belongs to the genus *nymphæa*, it having been dedicated by the Greeks to the water nymphs. In this the sepals are four, green on the outside, but petal-like within; the petals are very numerous, in several rows, the inner ones becoming narrower and smaller until they gradually pass into stamens, which are also numerous and, with the petals, attached to the surface of the many-celled ovary, which bears at the top a globular projection with radiate stigmas, each of which bears an incurved sterile appendage; the fruit, which ripens under water, is berry-like, pulpy within, and each of its numerous seeds is enveloped in a thin membranous sac. Of about 20 species, two are found in the United States, and the others are widely distributed, some being found in South Africa and Australia. Our common species, *N. odorata*, has nearly orbicular leaves, which often cover a broad surface of water on the margins of lakes and ponds, forming what are known as lily pads; the flowers, which open very early in the morning, are often over 5 in. across, of the purest white, and most delightfully sweet-scented. The flowers vary considerably in size, one (var. *minor*) being only half as large as the ordinary form; in some localities the flowers are slightly tinged with pink, and they are found, though rarely, with the petals bright pink throughout; the leaves also vary in size, and sometimes are crimson on the under side. The rootstock, as large as one's arm or larger, and several feet long, is blackish externally, and marked with scars left by the leaves and flower stems; it is whitish and spongy within, and has an astringent and bitterish taste; it is in repute among botanic physicians as a tonic and astringent. Though the plant often grows in water several feet deep, the leaf and flower stalks accommodate themselves to the depth, and they may sometimes be found where there is but a few inches of water; the plants may be cultivated in a tub or shallow tank containing earth and kept well supplied with water. Another species, so like the preceding in general appearance as to have escaped notice, was first distinctly identified and described in 1865 by Dr. J. A. Paine in his catalogue of the plants of Oneida co., N. Y. It differs from the other chiefly in its larger leaves, a foot or more wide; its larger flowers, 4½ to 9 in. across, which have broader and blunter petals and are nearly scentless, or at most with a slight apple-like odor quite unlike the rich perfume of the preceding; and more especially in bearing numerous simple or compound tubers upon the rootstock, which resemble Jerusalem artichokes and spontaneously detach themselves from it, and on account of which Dr. Paine called it *N. tuberosa*. It is found in central New York, southward and westward.—The common water lily of Europe and Asia is *N. alba*, which closely resembles our *N. odorata*, but its flowers have broader petals and are scentless. There are several exotic species of great beauty, cultivated by those who have greenhouses fitted with a tank for aquatics; the best known is *N. lotus*, white, a native of Egypt, whose ancient inhabitants used the seeds as food; it is the white lotus of the Nile. *N. dentata*, from Sierra Leone, has leaves sometimes 2 ft. across, and white flowers with a diameter of 14 in. The blue lotus of the Nile, *N. cærulea*, has sweet-scented flowers, about the size of our own fragrant species, but of a charming blue color. Another blue species is *N. gigantea* from Australia, with flowers more than a foot across. There are other blue-flowered species, or varieties, as some regard them, and some with red flowers, such as *N. rubra*, from the East Indies.—The largest of our water lilies is one of the two species of *nelumbium*, so called from *nelumbo*, the Ceylonese name of the Asiatic species. Ours, *N. luteum*, called sacred bean, water chinquapin, and sometimes nelumbo, is found in the western and southern waters, and in a few isolated localities in Connecticut, New Jersey, Pennsylvania, and western New York, to which it is supposed to have been introduced by the aborigines; the rootstocks are tuberous; the leaves stand high out of water; the blade, attached to the stalk by the centre and strongly ribbed, is often 2 ft. across, with a deep cup-like depression in the centre; the flowers, also emersed, are 5 to 6 in. across, the numerous sepals and petals alike, the many stamens slender, and the 12 to 40 ovaries imbedded in a disk or torus, which becomes 4 to 6 in. across, into the cavities in which the acorn-like nuts are set like plums in a pudding. This was an important plant to the aborigines, as the tubers, resembling in appearance those of the sweet potato, with a proper amount of boiling become quite farinaceous, and, according to Nuttall, are as agreeable and wholesome as the potato; the seeds are also edible. The other species, *N. speciosum*, is regarded as the sacred lotus of the ancient Egyptians; it grows throughout the East, but is no longer found in the Nile, though many sculptured representations of it remain; it is nearly like *N. luteum*, but has pink or rose-colored flowers and smaller stamens; the tubers and seeds are used as food in China and elsewhere, and the fibres of the leaf stalks as lamp wicks.—The grandest of all water lilies, from the tributaries of the Amazon, bears the name *Victoria regia*. Though it was discovered as early as 1801, and mentioned by subsequent travellers, it was not named till 1838, when Lindley described it and dedicated it to his sovereign; but it was not till about 1850 that it was introduced into cultivation through the efforts of the traveller Spruce. In cultivation the *Victoria* is an annual, with a fleshy rootstock, from which are produced leaves from 6 to 12 ft. in diameter; these are fixed to the petiole by the centre, and have the margin turned up as a border 2 or 3 in. high, giving the leaf the appearance of a huge tray; their upper surface is of a rich green color, and studded with small prominences; the lower surface, purple or violet, is traversed by ridge-like veins, radiating from the centre, and connected by cross veins, which divide the whole into compartments; the veins and the leaf stalks are covered with spines or prickles. These enormous leaves, especially adapted by their structure to float, are capable of sustaining the weight of a large water fowl, and by placing a board upon them to distribute the weight, they will hold up a child 10 years old. The flower is of two days' duration. The first day it opens about 6 o'clock P. M., and remains open until about the same hour the next morning; in this stage it is cup-shaped, 12 to 16 in. across, with numerous pure white petals, and emits a delightful fragrance. The second evening the flower opens again, but it presents an entirely different appearance; the petals are now of a rosy pink color, and reflexed, or bent downward from the centre, to form a handsome coronet, but now without odor; the flower closes toward morning, and during the day it sinks beneath the surface to ripen the seeds. In cultivation the plant requires a tank 20 to 30 ft. across and 3 or 4 ft. deep, with a special arrangement of pipes for heating the water to 80° or 85°. When it was first introduced, several private establishments had a Victoria house; but as the cultivation is difficult and expensive, the plant is now only seen in a few public gardens. In England Sir William Hooker, and in this country Mr. J. F. L. Allen of Salem, Mass., have published splendid monographs, in which the *Victoria* is shown in various


Nelumbo (Nelumbium luteum).


Victoria Water Lily (Victoria regia).

stages of development. In South America the seeds are called water maize; they are very farinaceous, and are roasted and eaten.

WATERLOO, a village in Belgium, on the outskirts of the forest of Soignies, 8 m. S. by E. of Brussels; pop. in 1871, 2,935. Near this village was fought, June 18, 1815, the battle between the allied English, Netherland, and German troops under Wellington, and the French under Napoleon, which resulted in the complete overthrow of the French emperor. On June 14 the forces of Wellington, comprising about 92,000 British, Hanoverian, Brunswick, Nassau, and Netherland troops, were cantoned between the river Scheldt and Nivelles, the duke having his headquarters and reserves at Brussels; while Blücher, with three corps of Prussians, about 90,000 men, occupied Namur, Charleroi, and the adjacent country on both sides of the Sambre. Napoleon decided to attack the Anglo-Prussian troops before the other contingents of the coalition could reach the frontier, and on the evening of the 14th advanced from Beaumont toward the point of junction between Blücher and Wellington, with 124,000 men. On the 15th he drove in the Prussian outposts S. of the Sambre and entered Charleroi, which was evacuated by the Prussians, who by 2 A. M. of the 16th were concentrated to the number of 80,000 at Ligny, between St. Amand and Sombreffe, facing the Sambre. At 5 P. M. on the 15th Wellington issued orders to the outlying divisions of his forces to concentrate at Quatre-Bras, an important strategic point where four roads meet, from Brussels, Charleroi, Nivelles, and Namur. At 4 o'clock next morning the whole army was moving in the same direction, followed by Wellington, who, for the purpose of allaying public fear, had attended a ball given at Brussels by the duchess of Richmond. Napoleon, having sent Ney with 40,000 men to occupy Quatre-Bras and prevent the junction of the English with the Prussians, moved with the rest of his army toward Fleurus, and at half-past 2 in the afternoon of the 16th attacked Blücher at Ligny. Ney, after fatal hesitation, engaged the Anglo-Netherland forces under command of the prince of Orange at Quatre-Bras, 7 m. from Ligny, whither Wellington had ridden to confer with Blücher. After an engagement of five hours, the Prussians were defeated at Ligny, and retreated toward Wavre; but at Quatre-Bras the allied forces held their ground until the British divisions of Picton and Cooke arrived, when the French retired, having failed to carry the position, but succeeded in hindering the junction of the English with the Prussians. Wellington's troops passed the night of the 16th on the field near Quatre-Bras, and at 10 A. M. of the 17th, the defeat of the Prussians and their line of retreat having been ascertained, moved toward Waterloo, where they arrived in the evening. By arrangement Blücher, if defeated, was to join Wellington at Waterloo with the least possible delay. On the morning of the 17th Napoleon, having directed Marshal Grouchy with 34,000 men and 96 guns to "follow up the enemy," proceeded with the main body of his army toward Waterloo, hoping to defeat Wellington's army before it could be reënforced by Blücher. He arrived too late in the day to give battle, and both armies bivouacked on the field. The allied forces occupied a semicircular ridge a mile and a half in length in front of the village, and the French an opposite ridge, the two being separated by a valley from 500 to 800 yards in width. About 400 yards in front of the British right centre stood the stone château of Hougoumont, occupied by a strong force; and fronting the left centre, near the hamlet of Mont Saint-Jean, was the farm of La Haie Sainte, also strongly occupied. Napoleon's army was drawn up in three lines on both sides of the road from Charleroi to Brussels. In his first line were the infantry corps of Reille and Drouet, with Piré's cavalry; the second line consisted of cavalry in the rear of the wings, and the third line of the sixth corps under Lobau. Behind the whole was the imperial guard, constituting the reserve. Napoleon's headquarters were at the farm of La Belle Alliance on the Charleroi road, near his centre. The armies were nearly equal; the French numbered about 72,000 men, mostly veterans, of whom 15,000 were cavalry, and 240 guns; and the allies about 70,000 men, including 13,500 cavalry, and 159 guns. The English contingent was a little over 25,000 men, mainly new recruits, the Netherlanders about 17,500, and the rest were Brunswickers, Hanoverians, and other Germans. Rain from noon on the 17th until the next morning impeded movements, and Napoleon, confident that Grouchy would prevent the arrival of the Prussians, deferred the attack on the 18th until the ground should be dry enough for manœuvres of artillery. His intention was to turn the allied left, force it back upon the centre, and gain possession of the highway leading through the forest, Wellington's only line of retreat. To draw off the duke's attention to his right, the divisions of Jerome Bonaparte, Foy, and Bachelu moved at half-past 11 o'clock upon the château of Hougoumont. The surrounding wood was taken and retaken several times, remaining at last in the hands of the French; but the building defied every effort of capture, and at 2 P. M. was still in possession of its defenders. Shortly before this time the advance of the Prussian corps under Bülow, which had not participated in the battle of Ligny, was seen at a distance on the French right, approaching from Liége. Napoleon detached 10,000 men under Lobau to watch the Prussians, and sent new orders to Grouchy to march upon St. Lambert and take the enemy in the rear. The weakening of his centre by the loss of Lobau's troops necessitated a change in his plan of battle, and about half past 1 o'clock Ney was ordered to break through the allied centre, and push their right back toward Brussels. Ney accordingly moved against La Haie Sainte, and after a fierce assault carried it; but his progress was checked by the English division of Picton and Ponsonby's brigade of heavy cavalry, and the French were forced back into the ravine, where Milhaud's cuirassiers came to their assistance and compelled the English to retire. Picton and Ponsonby were killed. Ney reformed his troops and again advanced to the attack, preceded by Milhaud's cavalry and a brigade of the light cavalry of the guard. After a gallant defence the German troops who held La Haie Sainte were overpowered by the French infantry, and at half past 3 the farm again fell into the hands of the assailants. The stubborn resistance of the English guards at Hougoumont induced the French to direct a battery of howitzers against the building; but this, though set on fire by shells, was held to the last. But Wellington, seeing the attack on this point was relaxing in vigor, strengthened his centre with troops from his right and rear. After the capture of La Haie Sainte there was a pause in the French operations against the allied centre, as Napoleon was watching the movements of Bülow's corps, which was beginning to debouch on the French right; and at 4 o'clock Wellington directed two bodies of troops upon the enemy at Hougoumont and La Haie Sainte. The attack upon the latter position was repelled by Ney, who sent for reënforcements to make a decisive onslaught upon the allied centre. Napoleon, unable to spare infantry and obliged to go to the right in person to look after the Prussians, gave him the cuirassiers of Milhaud, not for the proposed attack, but to hold his position. An error of Lefebvre-Desnouettes, who commanded the light cavalry of the guard, caused him to follow Milhaud, and Ney, finding these two powerful bodies of horse under his command, hurled them in succession upon the squares of the enemy. Napoleon, learning what Ney was doing, exclaimed: "It is too soon by an hour;" but to sustain the movement thus begun, he ordered part of Kellermann's cuirassiers to Ney's assistance. Behind these were standing 2,000 heavy cavalry of the guard, and some of their officers going forward to witness Ney's charges, the men understood them to give the signal to advance, and were soon mingled in the *mêlée.* Napoleon sent Bertrand to hold them back, but Ney had already launched them against the allied line, which had begun to waver, and, could Ney have had the infantry he desired, would have been utterly defeated. A French division under Durutte had meanwhile carried La Haye and Papelotte on the allied left, and Lobau had driven Bülow's forces out of the village of Planchenois on the French right. But rumors of the approach of Blücher's army inspired renewed courage in the allies, and dampened the ardor of the French; and soon after 7 o'clock Napoleon, despairing of the coöperation of Grouchy, collected four battalions of the middle guard and six of the old guard for a final effort against the allied centre. The middle guard, led by Ney, advanced upon the enemy, but had scarcely commenced the attack when Ziethen's Prussian corps appeared on the French right. La Haye and Papelotte were speedily retaken, and the six battalions of the old guard separated from the middle guard, and formed in squares across the field to cover the retreat of Durutte's fugitives. The middle guard, assailed in front and flank by the allies, held their ground under a fire which rapidly thinned their ranks. Ney, covered with dust and blood, with his clothes torn and his head bare, but still unwounded, though five horses had been shot under him, headed them on foot sword in hand. But the growing confusion in the French right demoralized the veterans, and they retreated. The other six battalions held their ground against overwhelming numbers. The dispersion of the French right by the cavalry brigades of Vandeleur and Vivian isolated them from the rest of the army, but still they stood firm. Finally, when five squares were broken and the rest began to show signs of exhaustion and depletion, the emperor gave the order for their withdrawal, and the cry, "The guard is repulsed," converted retreat into flight. At this moment Wellington advanced his whole line of infantry, and, the Prussians moving simultaneously, the rout of the French became complete. Napoleon, with one regiment of the guard thrown into square, endeavored to form a rallying point for the fugitives. Failing in this, he expressed his determination to die within the square, but was hurried away by Soult, the guard covering his escape. The heroic band was soon surrounded and called upon to surrender. "The guard dies, it does not surrender," is the reply popularly attributed to Gen. Cambronne; and with the cry of *Vive l'empereur*, the remnant of the guard charged upon the enemy and perished almost to a man. At half-past 9 P. M. Blücher and Wellington met at Maison du Roi in the rear of the late French centre, and Blücher continued the pursuit of the enemy. The total loss of the allies, including the Prussians, was about 23,000, and that of the French upward of 30,000, besides 227 pieces of cannon.—Of the repeated orders sent to Grouchy at 10 the previous evening, at 3 A. M., and again immediately before the battle, none reached him till 4 P. M. Long before that hour Gérard and Vandamme besought him to break off his pursuit of the Prussians, and march to Waterloo, but he refused. Instead of obeying the emperor's explicit orders when they finally reached him, he made a useless attack upon a corps which Blücher had left at Wavre; and thus the last great battle of Napoleon was lost.

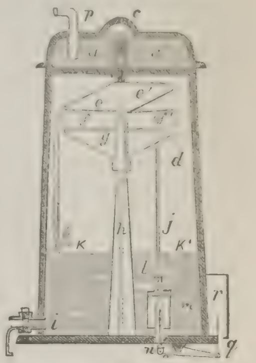
WATERLOO, a W. central county of Ontario, Canada, drained by the Grand river; area, 530 sq. m.; pop. in 1871, 40,251, of whom 22,050 were of German, 7,315 of Scotch, 5,056 of English, 3,220 of Irish, 1,536 of French, and 583 of Dutch origin or descent. It is traversed by the Grand Trunk and Great Western railways. Capital, Berlin.

WATERLOO, a city and the county seat of Black Hawk co., Iowa, on both sides of Cedar river, 85 m. W. of Dubuque and 90 m. N. E. of Des Moines; pop. in 1870, 4,337; in 1875, 5,508. It is regularly laid out, the streets running N. W. and S. E. in conformity with the course of the river. The business portion is substantially built, chiefly of brick. It is surrounded by a fine agricultural country, and has good water power. Ample railroad facilities are afforded by the Illinois Central, the Burlington, Cedar Rapids, and Minnesota, and the Cedar Falls and Minnesota lines. There are two large flouring mills, a woollen mill, several founderies, a manufactory of agricultural implements, a cheese factory, and a pork-packing establishment. The city has a national bank, a private bank, a savings bank, three public school houses, a Roman Catholic school, a seminary, three weekly newspapers (one German), and Baptist, Congregational, Episcopal, Evangelical, Lutheran, Methodist, Presbyterian, Roman Catholic, and Universalist churches.—Waterloo was first settled in 1846. It was laid out as a town in 1854, and incorporated as a city in 1868.

WATERLOO, Antoni, a Dutch engraver, born about 1600, died near Utrecht in 1662. He was early admitted to the corporation of painters in Utrecht. Several of his landscapes of Dutch scenery are in Rotterdam, Berlin, Munich, and Dresden, and his "Fishermen" is at Florence. He excelled in engravings, which according to Bartsch comprise 136 pieces. Good impressions command high prices.

WATERMELON. See MELON.

WATER METER, an apparatus for measuring the water which flows through a conduit. An approximation may be arrived at by measuring the velocity of water passing through a pipe of a given section. A rotary apparatus in which two S-shaped arms play into each other within a circular box, against the inside of which one end or the other of each of the arms constantly rests, as in Payton's meter, is used by the London water meter company. But the most usual form of meter employs a tilting double pan, or a tilting double-chambered vessel.—Cochrane's meter, exhibited in the United States section of the Paris exhibition of 1867, possesses nearly all the elements of a good instrument. It is represented in section in the figure. The water enters through the pipe p into the chamber $a\,a$, which has a dome-shaped air chamber c at the top. From $a\,a$ the water passes through the tube b into the double pan $e\,e'$, divided into two equal compartments by a partition. This pan tilts with a rolling friction upon its bearings. Beneath it is a lever, $f\,f'$, slightly bent, the motion of which is limited by the piece g below it. Suppose the pan $e\,e'$ to be in the position represented in the figure, the water will flow into the compartment e' through the tube b. When it contains a certain volume of water the side e' will preponderate. In falling, water will continue to flow into it until the partition passes the tube b, when it will flow into the compartment e; but the side e' will continue to descend until it strikes the lever f' and causes this to descend to the surface of g. As soon as the side e in turn contains a certain quantity of water, it will descend and discharge itself, as shown in the figure. The rod j, moved up and down by the lever $f\,f'$, operates a lever $n\ o\ q$, which by means of a ratchet movement registers the number of vibrations on dial plates in a case r, at the same time alternately opening and shutting orifices in the box $l\,m$, which allow of the exit of a small quantity of water and the admission of air into the chamber d. The water is discharged through the stopcock i, or by pipes.—Another form of tilting meter is that of E. Duboys of Paris. It consists of two basin-shaped vessels with thin rims applied so as to enclose a cavity. A flexible diaphragm of caoutchouc is held between the rims, dividing the cavity in two. Passing transversely through the axis of the double vessel there is a rod, having around it a sliding weight which is attached to the centre of the diaphragm. The water enters alternately through two ducts on either side of the diaphragm, which is thus forced alternately to the bottom of each basin. As each side is in turn filled, the vessel tilts over, and the current of the water is reversed; what was an entrance becomes an exit duct, and what was an exit becomes an entrance duct. The rod holding the weight attached to the centre of the diaphragm has also a limited motion, and is so adjusted that the vessel is kept from tilting until each side is quite filled, by which means accuracy of measurement is secured.



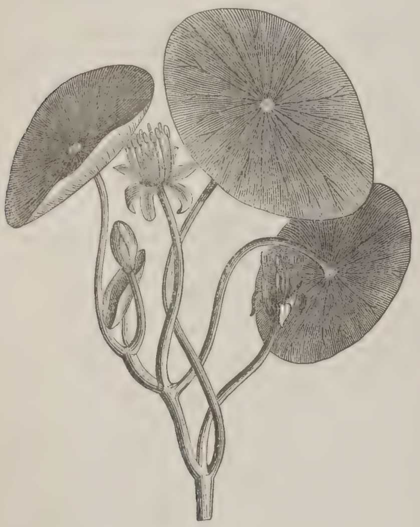
Cochrane's Water Meter.

WATER OATS. See RICE, INDIAN.

WATER RAM. See HYDRAULIC RAM.

WATER RAT, or **Beaver Rat,** the common name of the *hydromys chrysogaster* of Tasmania. It comes near the muskrat in size and habits, being an excellent swimmer and diver, shy, and nocturnal in habit; it lives in banks bordering both salt and fresh water, and has the habit of supporting itself on the hind legs and thick tail, while it conveys its food to the mouth by the fore limbs. It is of a dark rich brown color above, and golden yellow below; basal half of tail black, the rest white. The total length is about 2 ft., of which the tail is half.

WATER SHIELD, an aquatic plant of the genus *brasenia* (an unexplained name), which formerly with *cabomba* made up the family *cabombaceæ*, but is now classed with the water lilies in *nymphæaceæ.* It differs from the members of that family (see Water Lily) in having long, slender stems, which arise from prostrate rootstocks, fork above, and bear leaves and flowers; the entire oval leaves, with the slender petioles attached at the centre, are 1½ to 4 in. long, and floating; the upper surface is green, and the under surface, with all other parts of the plant, of a dull purple; all the submersed portions of the plant are covered with a thick coating of an exceedingly transparent jelly-like substance. The solitary flowers, on axillary peduncles, bloom at the surface, but are soon submersed; they are about an inch across, with calyx and corolla each of four parts, 12 to 18 stamens, and 4 to 18 pistils, which are distinct, a few of them ripening into one- or two-seeded pods. The plant varies much in the size of its leaves and length of its stems, which, according to the depth of the water, are from 1 to 15 ft. long. There is but one species, named, from the character of its leaves, *B. peltata*, found in ponds and slow streams from Canada to the gulf of Mexico, and along the northern border to Puget's sound; it occurs also in eastern India and Australia. The related *cabomba Caroliniana*, in the waters of North Carolina and southward, has small floating peltate leaves, with much divided submersed ones, and whitish or yellowish flowers.



Water Shield (Brasenia peltata).

WATER SPOUT, a diminutive whirlwind, lasting from a few seconds to an hour, and reaching down from the under surface of a cloud to or nearly to the surface of the earth. In the centre of this whirlwind appears a slender column of water or dense vapor, constituting the water spout proper. This column often descends but a short distance, like a pouch, but in its complete stage it reaches to within from 10 to 50 ft. of the earth or sea, and is accompanied by a cloud of whirling dust or spray raised from the ground or sea. The column is probably hollow, and the air whirling around it is sometimes an ascending, but more frequently a descending current; the latter apparently is especially the case in the "cloud bursts" that occasionally desolate limited regions.—For the theory of water spouts see Whirlwind, and the memoir by Faye in the *Annuaire du bureau des longitudes* (Paris, 1874).

WATERTON, Charles, an English naturalist, born at Walton hall, near Wakefield, Yorkshire, June 12, 1782, died there, May 27, 1865. He was educated at Ushaw and Stonyhurst. In 1804 he went to Demerara to superintend his uncle's estates, and travelled through the interior of the country to study natural history. In 1814, on his father's death, he returned to England, and made of the estate of Walton park a safe retreat for birds and beasts, surrounding it with a stone wall 8 ft. high, and never allowing a shot to be fired on his grounds. In 1825 he published "Wanderings in South America, the Northwest of the United States, and the Antilles." He was especially distinguished as a bird stuffer, and his collections at Walton hall are almost unrivalled. He made several other voyages to South America, and contributed to "Loudon's Magazine" many articles on natural history, subsequently published in a separate volume (2d ed., 1838, with an autobiography).—See "Charles Waterton, his Home, Habits, &c." (London, 1866).

WATERTOWN, a city and the county seat of Jefferson co., New York, on the Black river, 10 m. above its mouth in Lake Ontario, at the intersection of the Rome, Watertown, and Ogdensburg and the Utica and Black River railroads, 145 m. N. W. of Albany and 250 m. N. W. of New York city; pop. in 1870, 9,336; in 1875, 10,041. The city is handsomely laid out in wide streets, well shaded principally with maple, and contains a large number of handsome public buildings and private residences. The county poorhouse and insane asylum are just outside the city limits. Brookside cemetery is about 3 m. S. of the city, and contains 70 acres. The grounds of the county agricultural society and the river park race course are within the limits. The river divides the city into two unequal portions, which are connected by three bridges, one a suspension bridge of iron. It is surrounded by a rich agricultural country, abounding in limestone and iron, with which it carries on a valuable trade. It has unbroken railroad connection with New York and the Pennsylvania coal regions. The Black river falls 112 ft. in its passage through the city, a distance of less than two miles, affording water power equivalent to nearly 84,000 horse power, much of which is utilized. The chief establishments are six flouring mills, producing 200,000 barrels annually; four paper mills, producing 3,600 tons of printing paper annually; steam engine works, two founderies, sewing machine works, a spring wagon manufactory, knitting machine works, a paper flour sack manufactory, a cotton mill, four tanneries, two carriage manufactories, two furniture factories, two breweries, a malt house, nine boot and shoe factories, seven cigar factories, five planing mills, and five sash and door manufactories. There are four national banks, with an aggregate capital of $760,000; two state banks, capital $400,000; a savings bank, with $314,842 deposits in 1875; and four fire insurance companies. The city has an efficient police force and fire department, and is lighted with gas. Water is pumped from the river into two reservoirs with a combined capacity of 6,500,000 gallons, within one mile of the centre of the city, on the brow of a limestone ridge 180 ft. above the level of the public square. The assessed value of real estate in 1875 was $5,496,225; of personal property, $3,460,300. The public schools embrace a high school and inferior grades. There are nine school buildings; children of school age in 1875, 3,031; number enrolled, 2,032; teachers, 44; school expenditures, $36,996 35, including $17,998 50 for teachers' wages; value of school property, $88,131 58. The public school library contains 2,728 volumes. Two daily and three weekly newspapers are published. There are nine churches, viz.: Baptist, Episcopal (2), Methodist (2), Presbyterian (2), Roman Catholic, and Universalist.—Watertown was settled in 1800, incorporated as a village in 1816, and as a city in 1869.

WATERTOWN, a city of Wisconsin, partly in Dodge and partly in Jefferson co., on both sides of Rock river, spanned here by six bridges, at the junction of the Chicago and Northwestern, and the Chicago, Milwaukee, and St. Paul railroads, 43 m. W. by N. of Milwaukee, and 35 m. E. by N. of Madison; pop. in 1870, 7,550; in 1875, 9,524. It is divided into seven wards, of which five are in Jefferson co. and two in Dodge co. It is surrounded by one of the most productive districts in the state, and has an important trade. The chief manufactories are six flouring mills, two breweries, a threshing machine factory, three brick manufactories, four saw mills, and two sash, door, and blind factories. There are two banks, four hotels, four union school buildings, five denominational schools, three weekly newspapers (one German), and 16 churches. Watertown is the seat of the Northwestern university (Lutheran), chartered in 1864, which in 1875-'6 had 7 instructors, 32 collegiate and 171 preparatory students, and a library of 2,100 volumes. The college of Our Lady of the Sacred Heart (Roman Catholic) was chartered in 1872, and in 1875-'6 had 8 instructors and 25 collegiate and 75 preparatory students.—Watertown was settled in 1836; it was incorporated as a village in 1849, and as a city in 1853.

WATERVILLE, a town of Kennebec co., Maine, on the W. bank of the Kennebec river, at Ticonic falls, and on the Maine Central railroad, 18 m. N. N. E. of Augusta; pop. in 1870, 4,852. It was divided in 1873, and in 1876 contained about 4,000 inhabitants. The falls afford a large water power, which is only partially used. The town contains the machine shops of the railroad company, a cotton factory of 30,000 spindles, two saw mills, a tannery, a shovel-handle factory, a flour mill, a shirt factory, and one manufactory each of doors, sash, and blinds, of furniture, of machinery and castings, and of boot shanks. There are four national banks, one savings bank, a weekly newspaper, seven public schools, and six churches. Waterville is the seat of Colby university, under the control of the Baptists; it was established as a literary and theological institution in 1813, and incorporated as Waterville college in 1821, and as Colby university in 1867. There are five fine college buildings. The regular course is similar to the ordinary four years' course of American colleges, but select courses may be pursued. The university library contains about 12,600 volumes, and the literary fraternity has a library of about 1,500. In 1875-'6 there were 8 professors and 91 students, of whom 8 were females. The Waterville classical institute is conducted as a preparatory department.

WATER WHEEL. See Wheel.

WATER WORKS, constructions for the purpose of collecting, conveying, and distributing water. They may be designed for supplying cities, single buildings, or mills, or for drainage or irrigation, and also for the purposes of navigation; and they were employed in the earliest times for all these purposes. (See Aqueduct.) In this article only those works will be considered by which cities are supplied with water. The construction of such works includes the consideration of the source of supply, its conveyance into reservoirs, and its distribution from these to the points of consumption. The supply is usually collected from springs or streams by means of dams which form reservoirs. The condition of the valley as to soil and its cultivation, and also that of the water respecting the amount of mineral and vegetable matter which it contains, should receive careful consideration. For the construction of the dam for collecting the water, see Dam. Such a reservoir formed in the stream is called a collecting reservoir, and usually empties into a second through an aqueduct; and this, called a receiving or storage reservoir, may flow into a third or distributing reservoir, or the receiving may also be a distributing reservoir. A succession of reservoirs generally aids in the purification of the water by facilitating deposition of sediment, or by filtration.—There are three principal systems of supplying water to towns: 1, the reservoir system; 2, the stand-pipe system; 3, the Holly system. The two first are sometimes classed under one, called the gravity system; the Holly is an artificial power system. The first system was the only one employed by the ancients; but in their aqueducts they neglected the principle of hydraulic pressure, constructing them with a continuous descending grade. Reservoirs are constructed, according to their situation and service, with earth embankments and puddled bottoms and sides, or of solid masonry of stone or brick and hydraulic cement, and the latter are sometimes surrounded with earth embankments. In constructing the walls, the engineer takes into consideration the degree of hydraulic pressure to which they are to be subjected and the nature of the material of which they are constructed, and also the liability of such material to become weakened or strengthened by time, always bearing in mind the hydrostatic law that the pressure of fluids against equal lateral surfaces increases from the top downward as the odd numbers 1, 3, 5, 7, &c., and also the practical rule that the walls of such structures should be able to withstand a much greater pressure than is likely to be brought to bear against them. In order to have the service pipes in a city freely deliver their water at all points, the surface of the water in the distributing reservoir should be considerably above the level of any of the service pipes, as the retardation of the flow and the decrease in pressure produced by the numerous discharging orifices at various levels will prevent the delivery of water in such pipes at the same level. The water is usually carried from the distributing reservoir in large mains, which are sometimes made of cement, but usually of cast iron; these mains run through the principal streets, and from them distributing pipes are carried through the different streets and are tapped by the service pipes of the several buildings. The distributing pipes are usually of iron, and in some cases also the service pipes; but the latter are generally of lead or of lead lined with tin. The reservoir system has a good and perhaps its best example in the supply of Croton water to the city of New York. Supplementary to the main system, there is a small reservoir in a tower at the High bridge, into which the Croton water is forced by two large pumping engines, for supplying the higher portions of the city adjacent. Boston is also admirably supplied by this system from Cochituate lake.—The stand-pipe system is not much used, especially in cold climates, as the water is liable to freeze in the stand pipe; but it may be employed with advantage in localities where the thermometer rarely falls below the freezing point. The system comprises a dam for the collection of water, or a large well or several wells from which the water is pumped either by steam or water power into a tall tower, usually constructed of iron, which is called a stand pipe. This stand pipe is in fact a small reservoir, which requires to be constantly supplied in order to maintain the necessary pressure in the mains and distributing pipes; and that system which employs only a very small reservoir needing constant supply is only another form of the stand-pipe system, with the advantage of having a body of water even in its small reservoir which is not liable to be frozen. In all systems of water works it is of the greatest importance, not only on account of economy and convenience, but also of the more important subject of health, that the supply pipes to their discharging orifices should be constantly filled with water, and that they should not, as unfortunately they often do, contain air in consequence of insufficient hydrostatic pressure, so that the inner surface of the pipes becomes corroded with soluble oxides and salts derived from the material of the pipes, the oxygen of the air and of the water, and other matters. The city of Brooklyn is supplied with water from an extensive rainfall drainage basin comprising about 60 sq. m. on Long Island. The upper side of this basin begins in the range of hills on the north side of the island, the water being carried through extensive and deep beds of gravel and sand toward the southerly shore of the island, where it is discharged into natural and artificial collecting reservoirs. These are: Jamaica pond, 5½ m. distant from the pump well, with an area of 40 acres, a storage capacity of over 6,000,000 gallons, and a daily supply capacity of over 3,000,000; the Brookfield reservoir, 8 m. from the pump well, with an area of 8¾ acres, a storage capacity of 15,500,000 gallons, and a minimum flow of nearly 2,000,000 gallons daily; Clear Stream pond, 8¾ m. from the pump well, with a storage capacity of 800,000 gallons and a daily flow of 750,000 gallons; Valley Stream pond, nearly 10 m. from the pump well, with an area of 17¾ acres, a storage capacity of nearly 19,000,000 gallons, and a minimum flow of 2,433,000; Rockville pond, about 12 m. from the pump well, with a storage capacity of over 3,000,000 gallons, and a minimum daily flow of over 2,500,000; Hempstead pond, about 12½ m. from the pump well, having an area of 23½ acres and a storage capacity of over 5,000,000 gallons; also Willet's and Smart's ponds, and Freeport creek, with a daily flow of 5,000,000 gallons; and One-mile pond, at the head waters of Jamaica stream. The quantity which may be supplied annually is therefore estimated in the neighborhood of 19,000,000,000 gallons. The consumption of the water in the city in 1872 was about 8,000,000,000 gallons, so that about 11,000,000,000 gallons flowed over the weirs during the year. Beginning at Hempstead, a closed conduit of masonry, 8 ft. 2 in. wide, conveys the water with a descent of 6⅓ in. per mile to Rockville, where the conduit is increased to 8 ft. 8 in. in width, at Valley stream to 9 ft. 2 in., at Clear stream to 9 ft. 4 in., and at Brookfield branch to 9 ft. 8 in., while from Jamaica pond to the pump well the width is 10 ft., and the descent 6 in. per mile. This portion of the conduit is capable of delivering, with 32 in. depth of water, 20,000,000, and with a depth of 5 ft. 47,000,000 gallons of water in 24 hours. A portion of the conduit rests upon pile foundations, and it is supported all the way by a bed of concrete 15 ft. wide. The bottom is an inverted arch of brick 4 in. thick, with a versed sine of 8 in. The top is a brick arch 12 in. thick, the height from the centre being 8 ft. 8 in. At convenient points along the line there are man holes, at the top or on the side, affording access for inspection or repairs. On this lower reach, between Jamaica and the pump well, the sides are of stone, 3 ft. high, with a lining of brickwork. Above this the brickwork is omitted. For nearly the whole length the aqueduct is covered with 4 ft. of earth, sloping from 1 perpendicular to 1½ and 2 horizontal. At the pump well the aqueduct terminates in an arched basin 52½ ft. long, at right angles to its course, and connecting with the pump well by four sluices. The total length of the aqueduct is 12·39 m., 7½ m. of which is 10 ft. wide and 8 ft. high. The pump well is of heavy granite masonry laid in hydraulic cement. The bottom, 2 ft. below that of the aqueduct, rests upon a bed of concrete, which in turn rests upon a heavy platform of timber. From this well the pumping engines raise the water 164 vertical feet into the Ridgewood reservoir. These engines are three in number, two beam and one crank engine, their united capacity being about 32,000,000 gallons in 24 hours. The reservoir is in two divisions, one having an area of 11·85 and the other 13·73 acres; the water surface when filled to a depth of 20 ft. being 170 ft. above high-water mark. The embankments contain puddle walls carried 2 ft. higher than the level to which the reservoir is filled, and the bottom is also puddled with clay. The inner slopes are paved with broken bowlder stone upon a bed of stone chips and gravel. The water flows into the reservoir from bell-shaped mouths of the force mains into an influx chamber of heavy stone masonry, and from these over an apron into each compartment of the reservoir. In traversing a distance of 1,200 ft. in the reservoir most of the sediment is deposited. The effluent chamber, also of massive stone masonry, has four sluice ways, and is separated from the stopcock chamber by a heavy stone wall 6 ft. thick, from which issue three mains, each 36 in. in diameter. Before entering the effluent chamber, the water passes through screens of copper wire. The total capacity of the reservoir is 161,090,444 gallons. At Mt. Prospect there is a reservoir with a capacity of 20,000,000 gallons for the supply of the higher portions of the city, which is filled by a pumping engine having a capacity of 112 gallons at each stroke. The force main has a 20-inch branch connecting with the effluent main, which may be used when the reservoir needs cleaning or repair, in which case the 20-inch main leading up to the influent chamber would act as a retard pipe to regulate the flow. The city of Philadelphia is supplied with water from the Schuylkill river by the Fairmount water works. The original works at Fairmount, driven by steam power, were commenced Aug. 1, 1812, to take the place of works which were in operation at Chestnut and Broad streets, and which were also worked by steam power. The Fairmount works were put in operation Sept. 7, 1815. At the foot of Fairmount hill there was erected a Boulton and Watt engine of 44 in. cylinder and 6 ft. stroke, working a double-acting pump of 20 in. diameter and 6 ft. stroke, raising the water through a 16-inch main 239 ft. long into a reservoir 102 ft. above low water in the Schuylkill river. Measures were taken in 1819 to use water power, and a dam was constructed across the Schuylkill, which was completed July 28, 1821. This dam, 1,600 ft. long, of hemlock, was rebuilt in 1842–'3 from low tide with white pine. The building of the present new dam was commenced in June, 1872, in front of the old one, upon a rock at the west end, and upon cribs at the east end. The breadth of overflow is 1,112 ft. The first wheel, a breast wheel, was put in operation July 1, 1822, and the ninth, a turbine, Dec. 16, 1851. The total quantity of water pumped in 1852 was 2,092,086,692 gallons. In 1866, 1867, and 1868, the daily average pumping was nearly 22,000,000 gallons. Since then more than $600,000 have been expended in constructing the new dam, new wheel house, and three new turbines, but the daily average supply has never equalled 25,000,000 gallons, which demonstrates the fact that the system is not as economical as that which employs steam power. The pumpage during 1875 was 7,670,009,198 gallons, a daily average of 21,013,724. The other works which supply Philadelphia with water employ steam engines, except the syphon, which takes the water from the Wissahickon and empties it into a basin at Mt. Airy. The capacity of the Spring Garden works is 22,000,000 gallons daily. On May 10, 1876, at the opening of the centennial exhibition, a new engine of 20,000,000 gallons capacity was put in operation. There are also the Delaware, Belmont, Roxborough, Chestnut Hill, and Frankford works. —The third system of water works, called the Holly system, owes one of its principal advantages to the fact that it is the best possible system for extinguishing fires, and also for keeping all the supply pipes constantly filled and maintaining a nearly equable pressure in them. It may employ steam or water as a power, and with a sufficient reserve force to allow of 100 lbs. or more to a square inch to be brought against the water in the pipes. The city of Rochester, N. Y., is supplied by the Holly system, having a dual arrangement: 1. Water is pumped from the Genesee river by a steam engine, which throws it directly into the supply pipes. The machinery runs constantly, ordinarily with the pressure of about 60 lbs. to a square inch; but in case of fire the pressure may be increased to 100 lbs. or more. There is an automatic contrivance by which the speed of the engine is reduced in proportion to the reduction of discharge in the supply pipes, and *vice versa.* 2. Water is brought through iron pipes from Hemlock lake, 28 m. distant. There are two reservoirs, a storage and a distributing one. The former is 10 m. from the city, and has a capacity of 85,000,000 gallons; the latter is 1¾ m. from the centre of the city, and has a capacity of about 30,000,000 gallons. Hemlock lake has an elevation of 388 ft. above the city, the storage reservoir 245 ft., and the distributing reservoir 127 ft. The reservoirs are so arranged that they may be disconnected with the supply, and this immediately connected with the lake. The first trial of the works was made on Feb. 18, 1874, with the following results: 14 one-inch vertical streams from different hydrants were thrown simultaneously to a height of 130 to 150 ft., then 20, and afterward 30 streams of the same size, the latter test involving the discharge of 8,220 gallons a minute; a two-inch stream was then thrown vertically 220 ft., and then a four-inch stream 465 ft. horizontally; next a three-inch stream was thrown over 285 ft. vertically; afterward a four-inch stream was thrown 297½ ft. vertically; and finally a five-inch stream was thrown to a height of 250½ ft. Long Island City and the villages of Flushing and College Point are also supplied with water by the Holly system, and it has been or is to be introduced into numerous towns in various parts of the country.

WATONWAN, a S. county of Minnesota, drained by the Watonwan river, flowing E. to the Blue Earth; area, 432 sq. m.; pop. in 1870, 2,426; in 1875, 4,024. The surface is rolling and the soil productive. It is traversed by the St. Paul and Sioux City railroad. The chief productions in 1870 were 75,865 bushels of wheat, 6,391 of Indian corn, 46,068 of oats, 11,171 of potatoes, 43,095 lbs. of butter, and 6,383 tons of hay. There were 528 horses, 2,430 cattle, 446 sheep, and 815 swine. Capital, Madelia.

WATSON, Elkanah, an American merchant, born in Plymouth, Mass., Jan. 22, 1758, died in Port Kent, N. Y., Dec. 5, 1842. At the age of 15 he was indentured to John Brown, a merchant of Providence, and at 19 was sent to Charleston and other southern ports with more than $50,000 to be invested in cargoes for the European markets. His journal, kept carefully on the route, is the best account we possess of the principal towns and villages of the colonies at the time of the revolution. In 1779, in partnership with Mr. Brown and others, he opened a commercial house at Nantes, France, and in 1784 returned to America. After spending four years in business in North Carolina, in 1789 he removed to Albany, N. Y., where for the next 18 years he was an active promoter of public enterprises, including the Oneida lake or Wood creek and Schenectady canal, the improvement of the navigation of the Hudson above Albany, the organization of stage routes west, and the advancement of education. In 1816 he organized the first agricultural society in the state of New York. In 1828 he removed to Port Kent, on Lake Champlain. He published a history of the New York canals (Albany, 1820), and of agricultural societies; and an abstract of his journals, including an unfinished autobiography, was edited by his son, Winslow C. Watson ("Men and Times of the Revolution," New York and London, 1855; 2d ed., illustrated, 1856).

WATSON, James Craig, an American astronomer, born in Middlesex (now Elgin) co., Canada West, Jan. 28, 1838. His father emigrated from Northumberland co., Pa., to Canada, and thence to Michigan. He graduated at the university of Michigan in 1857, and was appointed teacher of mathematics there. In 1859 he became professor of astronomy, in 1860 of physics and of mathematics, and since 1863 he has been director of the observatory at Ann Arbor, and has had entire charge of the astronomical department. He has discovered 19 asteroids, for which in 1870 he received the gold medal of the French academy of sciences. He went to Iowa in 1869, and to Sicily in 1870, to observe the eclipse of the sun, and in 1874 to Peking as head of the United States expedition to observe from that point the transit of Venus. Besides astronomical charts, he has published a "Popular Treatise on Comets" (Philadelphia, 1860), and "Theoretical Astronomy" (1868). He has contributed numerous papers to scientific journals.

WATSON, John Fanning, an American author, born at Batsto, Burlington co., N. J., June 13, 1779, died in Germantown, Pa., Dec. 23, 1860. He was successively a bookseller in Philadelphia, a bank cashier, and a railroad treasurer. He published "Annals of Philadelphia" (8vo, 1830; new eds., with appendix, 2 vols. 8vo, 1857-'8, and 1868); "Historic Tales of the Olden Times in New York" (1832); "Historic Tales of the Olden Times in Philadelphia and Pennsylvania" (1833); and "Annals and Occurrences of New York City and State" (1846).

WATSON, Musgrave Lewthwaite, an English sculptor, born at Hawkesdale, Cumberland co., in 1804, died in London, Oct. 28, 1847. He went to London in 1824, studied in Rome in 1825-'8, afterward worked under Chantrey, and was employed by New college, Oxford, to execute the statues of Lords Eldon and Stowell, for which Chantrey made the models. He made statues of Flaxman, of Queen Elizabeth (in the royal exchange), of Allan Cunningham, and of Nelson, a Hebe and Iris, and the model for the bass relief of the battle of St. Vincent for the Nelson column in Trafalgar square. A book on his "Life and Works" was written by Henry Lonsdale, M. D. (London, 1866).

WATSON, Richard, an English prelate, born at Heversham, Westmoreland, in August, 1737, died at Calgarth park, Westmoreland, July 4, 1816. He was educated at Cambridge, where in 1764 he became professor of chemistry, and in 1771 regius professor of divinity. In 1780 he was made archdeacon of Ely, and in 1782 bishop of Llandaff. His principal works are: "An Apology for Christianity, in a Series of Letters addressed to Edward Gibbon, Esq." (12mo, London, 1776); "Chemical Essays" (5 vols. 12mo, 1781–'7); "An Apology for the Bible, in a Series of Letters addressed to Thomas Paine" (1796); and "Miscellaneous Tracts" (1815). His autobiography, "Anecdotes of the Life of Richard Watson," was published by his son (London, 1817).

WATSON, Richard, an English clergyman, born in Barton-upon-Humber, Feb. 22, 1781, died in London, Jan. 8, 1833. At the age of 14, when he was a good Latin and Greek scholar, he was apprenticed to a carpenter; but he joined the Methodists the next year, began preaching, and was released from his indentures. He was ordained in 1800, afterward united with the Methodist New Connection, was for some time editor of the Liverpool "Courier," returned to the Wesleyan connection, and in 1817 was appointed one of the secretaries of the missionary society in London. He was a prominent advocate of emancipation. His chief works are: "A Defence of the Wesleyan Methodist Missions in the West Indies" (1817); "Theological Institutes, or a View of the Evidences, Doctrines, Morals, and Institutions of Christianity" (6 parts, 1823–'8), which is a standard text book of theology among Methodists; "Life of the Rev. John Wesley" (1831); and a "Biblical and Theological Dictionary" (1831). His life was written by the Rev. Thomas Jackson, who also edited a collection of his works (13 vols. 8vo, 1834–'7).

WATT. I. James, a Scottish inventor, born in Greenock, Jan. 19, 1736, died at his estate of Heathfield, near Birmingham, Aug. 25, 1819. He early manifested a taste for mathematics and mechanics, studied botany, chemistry, mineralogy, and natural philosophy, at 14 constructed an electrical machine, and at 18 went to Glasgow to learn to make mathematical instruments. He followed this trade in London in 1755–'6, then returned to Glasgow, and was appointed instrument maker to the university. He devoted his evenings to the study of German, Italian, and music, and constructed an improved organ. In 1758 he began his experiments with steam as a propelling power for land carriages, which he temporarily abandoned, and did not patent a road engine till 1784. He however continued his experiments with steam as a motive power; for his inventions and improvements, see STEAM ENGINE, vol. xv., p. 340. For some years he devoted himself to land surveying, and to superintending the surveys and engineering works on the canal between the rivers Forth and Clyde and the Monkland collieries canal to Glasgow, deepening the Clyde, improving the harbors of Ayr, Port Glasgow, and Greenock, building bridges, and other public works; his final survey (1773) was for the Caledonian canal. During this period he also invented an improved micrometer. In 1774 he became a partner of Matthew Boulton, founder of the Soho works near Birmingham, and in 1775 they began the manufacture of improved steam engines. The invention of the crank and fly wheel is disputed between Watt and Pickard; but to Watt is due the credit of inventing the separate condenser, the double-acting principle, parallel motion, the regulating action of the governor, and many more improvements. He was the first to apply steam to house warming (1784), though it had been before suggested. He visited Paris in 1786, and brought back to England Berthollet's process of bleaching with chlorine. In 1790 he purchased the Heathfield estate. He retired from the Soho firm in 1800, and afterward invented the letter-copying press. In 1809 he contrived a flexible iron pipe with ball and socket joints to adapt it to the irregular river bed, for carrying water across the Clyde. He was a fellow of the royal societies of London and Edinburgh, correspondent of the French institute, and foreign associate of the academy of sciences. He was buried beside Boulton in Handsworth church; his statue by Chantrey is in Westminster abbey, and a copy in bronze in front of the Manchester infirmary. J. P. Muirhead published "The Origin and Progress of the Mechanical Inventions of James Watt" (3 vols. 8vo, London, 1854), and "Life of James Watt" (1858), with selections from his correspondence; and Lord Brougham, Samuel Smiles, and others have written his biography. **II. James,** eldest son of the preceding, born Feb. 5, 1769, died at his seat of Aston hall, near Birmingham, June 2, 1848. He studied chemistry, mineralogy, and natural philosophy, and for a time was secretary of the Manchester literary and philosophical society. In 1789 he went to Paris for scientific study, and was soon in sympathy with the revolutionary movements. At first he was in high favor with the leaders, but becoming averse to their excesses he was denounced before the Jacobin club by Robespierre and was obliged to flee to Italy. He returned to England in 1794, became a partner in the Soho firm, and took an active part in the progress of steam navigation. In 1817 he bought the Caledonia of 102 tons, fitted it with new engines, went in it to Holland and up the Rhine to Coblentz, and after his return made material improvements in marine engines. **III. Gregory,** half brother of the preceding, born in 1777, died Oct. 16, 1804. At 17 he became a member of the Soho firm, but continued to study at the university of Glasgow. In 1801–'2 he was engaged in scientific researches on the continent. He wrote "Observations on Basalt, and on the Transition from the Vitreous to the Stony Texture, which occurs in the gradual Refrigeration of melted Basalt," &c. ("Philosophical Transactions," 1804). He had fused 7 cwt. of basalt, and suffered it to cool slowly in the mass; then, breaking it up, he had observed the structure of the different parts, the crystallization of the middle portion, which had necessarily cooled most slowly, being found the most complete.

WATTEAU, Jean Antoine, a French painter, born in Valenciennes, Oct. 10, 1684, died at Nogent-sur-Marne, near Paris, July 18, 1721. He early attempted landscapes, though he received but little instruction from his teachers, one of whom he accompanied in 1702 to Paris. He studied under Claude Gillot and Claude Audran, the custodian of the Luxembourg palace, where he found inspiration in Rubens's pictures; and he subsequently improved his coloring after the Venetian masters. After leaving Audran's studio in 1709, he received an academical prize for one of his pictures, and his "Departure of Troops" and "Halt of the Army" obtained for him in 1712 a pension from the king. In 1717, on being formally received as a member of the academy, he exhibited his "Embarking for Cythera," which made him famous. The merit of his faithful and brilliant delineations of the costumes, manners, and life of the latter part of the reign of Louis XIV. and under the regency, has been fully recognized in recent times. In 1875 a national subscription was proposed to erect a monument to him at Valenciennes. His *fêtes élégantes*, pastoral pieces, and genre pictures are remarkable for grace and originality, as well as his landscapes, which inaugurated a more unconventional method of painting. He also excelled in portraits and engraving. He left over 550 pieces, which have been engraved.

WATTS, George Frederick, an English painter, born in London in 1820. His cartoon of "Caractacus" obtained a first class prize at the Westminster hall competition in 1843, and his colossal oil pictures, "Echo" and "Alfred inciting the Saxons to Maritime Enterprise," received a prize of £500, and were purchased for the new houses of parliament. He has also painted for that edifice "St. George overcoming the Dragon," and in 1861 he completed in Lincoln's Inn hall a large design in fresco representing the great lawgivers of all races and times. He was made an associate of the royal academy in 1867. Of late he has confined himself principally to portrait painting.

WATTS, Isaac, an English clergyman, born in Southampton, July 17, 1674, died in London, Nov. 25, 1748. He was educated in his father's boarding school and at a dissenting academy in London under the Rev. Thomas Rowe, became in 1696 a private tutor at Stoke-Newington, and in 1698 assistant minister to the Rev. Isaac Chauncey of an Independent congregation then meeting in Mark lane, London, of which he became pastor in 1702. His health suffering, he obtained an assistant in 1703, and in 1712 went to live with Sir Thomas Abney, a London alderman, in whose family he remained as a guest 36 years till his death. His "Logic, or the Right Use of Reason" (London, 1725), and his "Improvement of the Mind" (1727), based on the philosophy of Locke, are the best known of his prose writings, though he also published a work on astronomy and geography, several volumes of sermons, and theological treatises, of which the best known is one on the Trinity. His poetical works include "Hymns and Spiritual Songs" (London, 1707), "Psalms of David imitated in the Language of the New Testament" (1719), and "Divine Songs attempted in easy Language for the Use of Children" (1726). Many of his psalms and hymns are found in all church collections. The first complete collection of his works was published by Drs. Jennings and Doddridge (6 vols. 4to, London, 1754). His biography by Dr. Johnson is included in the "Lives of the Poets." His *Horæ Lyricæ* was republished in 1837, with a memoir by Southey. Dr. Watts never married. His stature scarcely exceeded five feet. There is a monument to his memory in Westminster abbey, and a memorial hall in his honor at Southampton built in 1875.

WAT TYLER. See RICHARD II.

WAUGH, Edwin. See supplement.

WAUKEGAN, a city and the capital of Lake co., Illinois, on the W. shore of Lake Michigan, 35 m. N. by W. of Chicago, and 50 m. S. by E. of Milwaukee, with which places it is connected by rail; pop. in 1860, 3,433; in 1870, 4,507; in 1875, about 5,500. The city is principally built on a bluff rising near the lake shore abruptly to the height of about 80 ft. Between the bluff and the lake shore is a level tract, about 400 yards wide, occupied by dwellings, gardens, and some warehouses. The site is traversed by deep, winding ravines. Several mineral springs have been recently discovered, and the city is becoming a summer resort. It has an active trade, especially in produce, wool, and timber. The chief manufactories are the Forsyth scale works, the Werden table factory, and Powell's pump works. There are several fine school buildings, a bank, two weekly newspapers, and nine churches.

WAUKESHA, a S. E. county of Wisconsin, drained by Fox and Bark rivers; area, 576 sq. m.; pop. in 1870, 28,274; in 1875, 29,425. It has a level surface, diversified with prairie and woodland and numerous small lakes. The soil is extremely fertile. Blue limestone, excellent for building, is found. It is intersected by the Chicago, Milwaukee, and St. Paul railroad. The chief productions in 1870 were 651,605 bushels of wheat, 64,525 of rye, 518,798 of Indian corn, 501,443 of oats, 58,034 of barley, 29,287 of buckwheat, 406,134 of potatoes, 864,215 lbs. of butter, 33,585 of cheese, 308,071 of wool, and 50,339 tons of hay. There were 9,660 horses, 10,515 milch cows, 8,898 other cattle, 73,339 sheep, and 15,888 swine; 6 manufactories of agricultural implements, 13 of carriages and wagons, 13 of saddlery and harness, 6 of lime, 9 flour mills, 8 saw mills, and 2 woollen mills. Capital, Waukesha.

WAUPACA, a central county of Wisconsin, intersected by the Waupaca and Embarras rivers and their branches; area, 720 sq. m.; pop. in 1870, 15,539; in 1875, 19,646. The surface is undulating, and the greater portion is covered with dense forests of valuable timber. The soil is very fertile. Immense quantities of lumber are exported. Weyauwegan lake is in the S. part. It is traversed by the Wisconsin Central and the Green Bay and Lake Pepin railroads. The chief productions in 1870 were 196,582 bushels of wheat, 24,312 of rye, 103,300 of Indian corn, 111,357 of oats, 96,489 of potatoes, 283,563 lbs. of butter, 33,301 of wool, and 14,461 tons of hay. There were 1,796 horses, 3,606 milch cows, 4,798 other cattle, 10,378 sheep, and 3,609 swine; 3 manufactories of agricultural implements, 8 of carriages and wagons, 2 of iron castings, 5 tanneries, 10 flour mills, 19 saw mills, and 1 woollen mill. Capital, Waupaca.

WAUSHARA, a central county of Wisconsin, drained by Fox, White, and Pine rivers; area, 648 sq. m.; pop. in 1870, 11,279; in 1875, 11,523. The surface is undulating and partly covered with a heavy growth of good timber, much of which is exported. The soil is fertile. The chief productions in 1870 were 201,743 bushels of wheat, 64,200 of rye, 143,099 of Indian corn, 166,383 of oats, 21,951 of buckwheat, 91,391 of potatoes, 321,706 lbs. of butter, 42,769 of wool, and 13,394 tons of hay. There were 1,978 horses, 10,790 cattle, 11,771 sheep, and 3,954 swine; 5 flour mills, and 9 saw mills. Capital, Wautoma.

WAVE. See LIGHT, SOUND, and TIDES.

WAX, an organic product of animal and vegetable origin, and occurring also as a mineral, though of organic origin. The term was originally restricted to beeswax; but there are many kinds of wax, only a few of which have been accurately investigated. They are composed of carbon, hydrogen, and oxygen, carbon and hydrogen being greatly in excess. They are more or less hard at ordinary temperatures, melt below 212°, are insoluble in water, sparingly soluble or insoluble in alcohol, and soluble in ether, volatile and fixed oils, bisulphide of carbon, and chloroform. They burn with a brilliant flame in the air, and are not easily saponified by boiling with solution of potash, but readily form soap by fusion with solid potash.—The only animal waxes known to be such are common beeswax and Andaquies wax, produced by a bee found near the Orinoco and Amazon rivers, though Chinese wax, noticed further on, is by some supposed to be the product of an insect. Beeswax, ordinary wax, or cera, is the substance with which bees build their cells. It was formerly thought that these insects extracted it ready formed from plants; but the careful observations of Huber showed that when bees are fed upon pure sugar alone they will continue to secrete wax. Beeswax at ordinary temperatures is solid, tough, yellow, and has a peculiar odor and greasy feel. If pared in thin scales and exposed to the air in sunshine, it becomes bleached. It may also be bleached by the action of nitric acid, as well as by chlorine, which however combines with the wax, forming a substitution product which, being decomposed on burning, yields vapors of hydrochloric acid. According to Lewy, beeswax is composed of 80·2 per cent. of carbon, 13·4 of hydrogen, and 6·4 of oxygen. It is a mixture of three different substances: 1, myricine, insoluble in boiling alcohol and consisting principally of myricic palmitate; 2, cerotic acid, formerly called cerine, soluble in boiling alcohol, which crystallizes out on cooling; 3, ceroleine, which remains dissolved in cold alcohol. Beeswax, as usually seen in cakes, is obtained by melting the combs in boiling water, running off the wax, remelting with hot water or steam, and allowing it to flow upon horizontal wooden cylinders, which revolve half immersed in cold water. This forms thin ribbons, which are bleached by the air, light, and moisture, by exposure upon canvas stretched horizontally. When the bleaching process seems stationary, the wax is remelted, and the process is repeated until it becomes white. It is finally melted, strained through silk sieves, and cast in moulds. Beeswax is sometimes adulterated with starch, but the fraud may be detected by oil of turpentine, which dissolves the wax but not the starch. Mutton suet, a more frequent adulterant, may be detected by dry distillation, which causes in tallow the production of sebacic acid, a body which produces precipitation in a solution of acetate of lead. It is said that an adulteration of only 2 per cent. may be detected in this way. Stearine, also sometimes introduced, may be detected, according to Lebel, when forming less than 5 per cent., by dissolving the specimen in two parts of oil and adding acetate of lead, which produces a solid precipitate.—Chinese wax, or *pela,* also called vegetable spermaceti and vegetable insect wax, is generally supposed to be produced on certain trees by a puncture of a species of *coccus;* it covers the branches with a soft white coating about a line in thickness, which may be removed by boiling water. It consists chiefly of cerotate of ceryle, $C_{54}H_{108}O_2$. It is crystalline, and brilliantly white like spermaceti, but more brittle and fibrous; it melts at 179° F. It is used in China for making candles, and also in medicine. Cow-tree wax is obtained by evaporating the milk of the cow tree; it softens at 104° F., melts at 140°, and is insoluble in cold alcohol, but dissolves completely in boiling alcohol, and is saponified by alkalies. According to Berzelius, it resembles beeswax more than any other kind of wax. Cuba wax is yellowish brown, of unknown origin, imported from Cuba. It is softer than beeswax, and dissolves in warm ether and turpentine oil, and almost completely in boiling alcohol. It contains 76·5 per cent. of cerine, 10·5 of myricine, 2 of balsamic resin, and 3·5 of water. Japan wax, also called tree wax, is obtained in the East Indies from the root of *rhus succedanea.* It is yellowish white and somewhat softer than beeswax; slightly soluble in absolute alcohol at ordinary temperatures, completely so at the boiling point, and soluble in ether and in volatile and fixed oils. It is said not to be a true wax, but a glyceride, being resolved by fusion with potassium hydrate into palmitic acid and glycerine. The palm wax of Colombia is obtained from the *ceroxylon andicola.* The scrapings from the exterior of the tree are boiled by the Indians, and the wax rises to the surface. It is grayish white and crude, and after purification by digesting in alcohol is yellowish white; it fuses at about 162° F. The ocuba wax of Brazil is derived from the kernels of the fruit of several species of *myristica*, especially the *M. ocuba.* It melts at 98° F. The myrtle wax, which for many years has been an article of commerce in the United States, also known as "candleberry wax" and "bayberry tallow," occurs as an incrustation on the berries of the wax myrtle or bayberry, *myrica cerifera.* The berries are enclosed in bags of coarse cloth, and boiled in water, the wax collecting on the surface being drawn off and cast in moulds. It varies in color from grayish yellow to deep green, has a balsamic and slightly aromatic odor, a specific gravity of 1·004 to 1·006, fuses between 117° and 120° F., and is much harder and more brittle than beeswax. It is composed, according to Mr. G. E. Moore, of 20 per cent. of a substance called palmitine, which exists in palm oil, and 80 per cent. of palmitic acid, with a small quantity of lauric acid. Its illuminating power is scarcely inferior to that of the best beeswax; it costs only about one fourth as much, and is easily bleached and cast in moulds. The plant grows abundantly along the coast in New England and on Long Island. Plantations of it have long existed in Europe, and it has been cultivated in Algeria.—Several mineral substances resemble wax in physical properties and composition, the principal of which are ozocerite and hatchettine. Ozocerite was discovered by Meyer in a sandstone in Moldavia, in the vicinity of coal and rock salt. It also occurs at the Urpeth colliery, Newcastle-upon-Tyne. It has a resinous waxy consistence and translucence, and sometimes a foliated structure. Its specific gravity is 0·94 to 0·97. According to Johnston, the Urpeth variety melts at 110° F. and boils at 250°. It distils without decomposition, and is not altered by strong acids. The Moldavia variety dissolves slightly in ether, but the Urpeth to the extent of four fifths. Hatchettine or mineral tallow occurs in the coal measures of Glamorganshire, Wales, in crystals and amorphous thin laminæ having the consistence of spermaceti; specific gravity, 0·916. It has a greasy feel, melts at 133° F., and distils without change when cautiously heated. It is composed, according to Johnston, of 85·6 per cent. of carbon and 14·4 per cent. of hydrogen. Similar mineral waxes are also found in Moravia, and at Loch Fyne, near Inverness, Scotland.

WAXBILL. See Finch.

WAX FIGURES. The employment of wax in imitative art dates from a period anterior to historical times, although, according to Pliny, it was not cast in moulds previous to the time of Lysistratus, who flourished about 300 B. C., and whose productions, said to be the first of their kind, were chiefly portraits cast in plaster moulds taken from the face. Wax portraits eventually became common, and among the Romans, who placed them in the vestibules of their houses, were regarded as an evidence of ancient nobility, as none were allowed to possess such images whose families had not borne some curule magistracy. Polybius relates that these images, habited in the costume appropriate to their age and rank, were carried in funeral processions, or seated in chairs in the forum. In the middle ages wax was employed in the construction of images of saints and of votive images, and those who practised sorcery melted before a slow fire wax figures of the persons against whom their incantations were directed. In the latter half of the 15th century Andrae del Verrocchio and Orsino gained considerable reputation by some figures of Lorenzo de' Medici, their joint production, which consisted of frameworks of wood or skeletons for the bodies and limbs, while the heads, hands, and feet were cast in wax, painted in oil colors to counterfeit life. They were furnished with glass eyes and natural hair, and habited in the costume usually worn by Lorenzo. Vasari speaks of the life-like appearance of these figures, and adds that the art declined rapidly after the time of Orsino. The manufacture of wax figures of the size of life is still carried on to a considerable extent, but has long ceased to be considered a branch of the fine arts, no imitative skill or taste on the part of the artist being sufficient to overcome the ghastly fixedness which such images must always present. In the preparation of anatomical models and pathological examples, however, wax has been very advantageously employed, the invention being due to Gaetano Giulio Zummo, a famous modeller in colored wax, who flourished in the latter half of the 17th century. But this employment of wax has been to a great extent superseded by papier maché, which is much stronger and more durable, and can be more safely and conveniently handled in the lecture room. (See Anatomical Preparations.) Flowers are made from thin leaves of colored wax, and receive their local tints by means of a pencil.

WAX MYRTLE. See Bayberry.

WAX PLANT, a name given to climbing greenhouse shrubs of the genus *Hoya* (named in honor of Thomas Hoy, a distinguished English gardener of the early part of this century), of the milkweed family (*asclepiadaceæ*), and natives of various parts of the East Indies.

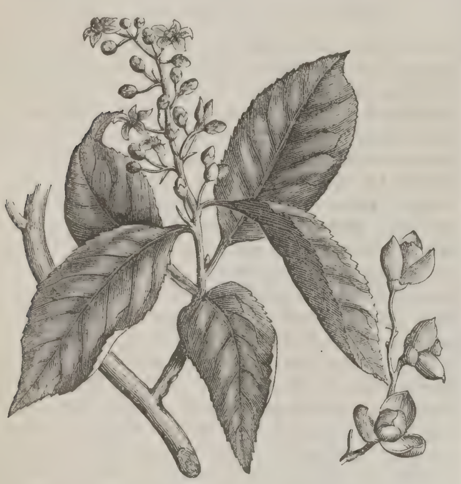
The plants have twining stems which throw out aërial rootlets, generally thick and fleshy opposite leaves, and flowers in dense umbels; the corolla is wheel-shaped, five-lobed, the upper surface covered with minute papillæ; in the centre is a crown composed of five thick appendages to the stamens and presenting the form of a star; the pollen is in masses as in the milkweeds. The most common wax plant is *H. carnosa*, the first species introduced; its flowers are flesh-colored, sometimes nearly white, and have a wax-like appearance, which with their very regular shape makes them closely resemble artificial flowers. About a dozen species are cultivated, among which are those with crimson, brownish, and yellow flowers. They take root readily, are of easy cultivation where there is sufficient sun and heat, and are used to train to the rafters or around the pillars of stoves or hothouses. The common species is one of the few stove plants that do well in window culture, its fleshy leaves resisting the drying effects of a furnace-heated atmosphere. The plants do not require much water, except when growing; the short flowering stems should not be cut away when the flowers fall, as they produce new clusters for several years in succession.

Wax Plant (Hoya carnosa).

WAXWING, a name applied to birds of the genus *ampelis* (Linn.) or *bombycilla* (Vieill.), derived from the appendages at the ends of some of the secondaries and tertiaries, which in color and texture resemble small pieces of red sealing wax; these are horny expansions of the shafts, and are found in both sexes. This group, which embraces two North American species, has by some been placed among the chatterers; Cabanis makes them a subfamily of the flycatchers, and Baird elevates them into a family (*ampelidæ*), coming near the shrikes in the notch of the lower mandible. The gape is very wide, but without bristles; bill short, broad at the base, compressed, and notched at the tip in both mandibles; wings long, broad, and pointed, with ten primaries, the first rudimentary and the second the longest; tail short and even; tarsi short, toes long, and claws curved and sharp. Unlike the chatterers, they are silent birds, and are found only in cold regions. The Bohemian waxwing or chatterer (*A. garrulus*, Linn.) is a handsome bird, about 8 in. long and 12½ in. in alar extent; the color is a general reddish gray, with a large patch on the throat and band on forehead black; crest and lower tail coverts brownish orange; primaries, secondaries, and tail tipped with yellow; two white bands on the wings; lower parts silvery gray. It is found in the extreme northern portions of America, Europe, and Asia, migrating to temperate latitudes in winter, being most common in the United States about the great lakes and the valley of the northern Mississippi. The epithet Bohemian is a misnomer, as they are no more abundant in Bohemia than in the more northern parts of Europe; they live principally and breed within the arctic circle. The food consists of berries of all kinds, especially of the mountain ash, hawthorn, ivy, and juniper; and they occasionally take insects, after the manner of the flycatchers. (See also CEDAR BIRD.)

Bohemian Waxwing (Ampelis garrulus).

WAXWORK, one of the common names for a climbing shrub, *celastrus scandens*, which is also in different localities called staff tree, climbing or shrubby bittersweet, and Roxbury waxwork. The genus *celastrus* comprises about 18 species, one of which belongs to the United States, the majority of the others being Asiatic; it gives its name to a family, the *celastraceæ*, of about 30 genera, several of which are North American, but only one other, *euonymus* or spindle tree, is at all common. The waxwork grows in moist soils from Canada to the Carolinas, and west beyond the Mississippi, climbing over rocks and upon trees to the height of 20 ft. or more; it is smooth throughout; its alternate, rather thin, ovate-oblong, pointed, finely serrate leaves are 2 to 5 in. long, dark green above and lighter below; the flowers are diœcious or polygamous, greenish, in racemes terminating the branches; the five-parted calyx is bell-shaped; the five petals toothed on the margins, and five stamens inserted on the edge of a disk which lines the calyx tube; ovary three-celled, with united styles, and a three-lobed stigma; the fruit is a globular three-celled pod, which when quite ripe opens by three valves, exposing the seeds, which are enveloped in a pulpy aril. The fruit is very showy; the pods, about the size of a large pea, are of a rich orange color, and are still more attractive when they open and expose the shining crimson mass which envelopes the seeds within. This is a fine ornamental climber, and is often cultivated; it covers a trellis or the supports to a veranda with a dense mass of shining green foliage, which turns yellow in autumn, and later its clusters of orange and crimson berries produce a brilliant effect. The vine should not be allowed to run upon valuable trees, as it clings around their trunks and branches so firmly as to stop their growth. The fruit is much used for decorative purposes, to work in with evergreens for Christmas designs, and to make up with autumn leaves into winter bouquets. The bark is used by botanic physicians as an emetic and diaphoretic, and they regard it as useful in chronic diseases of the liver; it is said to possess narcotic properties.



Waxwork (Celastrus scandens).

WAY, Right of. See REALTY.

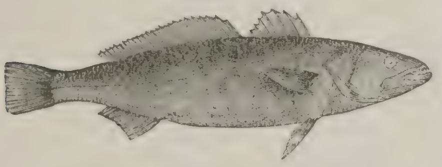
WAYLAND, Francis, an American clergyman, born in New York, March 11, 1796, died in Providence, R. I., Sept. 26, 1865. His parents were natives of Great Britain, and his father was a clergyman. He graduated at Union college in 1813, studied medicine, and was licensed to practise. In 1816 he joined the Baptist church in Troy, and soon after entered the Andover theological seminary. He was a tutor in Union college from 1817 to 1821, when he became pastor of the first Baptist church in Boston. In September, 1826, he was chosen professor of mathematics and natural history in Union college, and in December president of Brown university, Providence, R. I.; and he entered upon the duties of the latter office in February, 1827. In 1842 he published "Thoughts on the Collegiate System of the United States," in which he maintained that the study of the classics should be made optional to those desiring an education for other than professional purposes, and those who chose to take only a practical course should be allowed college honors expressive of their attainments. In 1849 the university was reorganized on the plan thus indicated. He retired in 1855, and acted for two or three years as pastor of the first Baptist church in Providence. His other works include "Elements of Moral Science" (Boston, 1835; abridged for the use of schools, 1836); "Elements of Political Economy" (1837); "Limitations of Human Reason" (1840); "Life of Rev. Adoniram Judson, D. D." (2 vols., 1853); "Intellectual Philosophy" (1854); "Notes on the Principles and Practices of Baptists" (New York, 1856); and "Letters on the Ministry" (1863). "Christianity and Slavery" (New York, 1845) is a controversy on slavery between Dr. Wayland and Dr. Richard Fuller, in which the former maintains decided anti-slavery views.

WAYNE, the name of 15 counties in the United States. **I.** A N. W. county of New York, bordering on Lake Ontario, and intersected by Clyde river; area, 572 sq. m.; pop. in 1870, 47,710; in 1875, 49,882. The surface is undulating and the soil fertile. Iron ore, water limestone, and gypsum abound, and there are salt and sulphur springs. It is traversed by the New York Central railroad and the Erie canal, also by the Lake Ontario Shore and Sodus and Southern railroads. The chief productions in 1870 were 476,348 bushels of wheat, 685,309 of Indian corn, 924,719 of oats, 408,962 of barley, 429,791 of potatoes, 1,615,325 lbs. of butter, 136,186 of cheese, 299,907 of wool, 25,850 of tobacco, and 63,616 tons of hay. This county ranks first in peppermint culture in the United States. There were 13,284 horses, 16,208 milch cows, 12,039 other cattle, 53,942 sheep, and 14,127 swine. The whole number of manufactories was 588; capital invested, $1,869,868; value of products, $3,451,334. The principal establishments were 22 manufactories of agricultural implements, 41 of carriages and wagons, 10 of cheese, 35 of cooperage, 1 of glassware, 16 of iron castings, 3 of machinery, 9 of malt, 57 of essences, 17 flour mills, 10 tanneries, 10 currying establishments, 5 planing mills, and 25 saw mills. Capital, Lyons. **II.** A N. E. county of Pennsylvania, bordering on New York, bounded E. by the Delaware river, and drained by Lackawaxen and other creeks; area, 720 sq. m.; pop. in 1870, 33,188. The surface is mostly hilly, and in the W. part somewhat mountainous. Iron ore is found. It is intersected by the Delaware and Hudson canal, and by the Pennsylvania coal company's and the Erie railroads. The chief productions in 1870 were 1,732 bushels of wheat, 15,075 of rye, 95,433 of Indian corn, 215,459 of oats, 92,364 of buckwheat, 255,355 of potatoes, 1,055,076 lbs. of butter, 49,526 of wool, and 59,756 tons of hay. There were 3,832 horses, 11,096 milch cows, 12,946 other cattle, 16,468 sheep, and 4,965 swine; 6 manufactories of agricultural implements, 11 of carriages and wagons, 3 of iron castings, 1 of engines and boilers, 5 of turned and carved wood, 18 tanneries, 2 planing mills, 63 saw mills, and 1 woollen mill. Capital, Honesdale. **III.** A S. W. county of West Virginia, separated from Kentucky by Sandy river, and from Ohio by the Ohio river; area, 415 sq. m.; pop. in 1870, 7,852, of whom 153 were colored. The surface is very hilly, and in most parts covered with forests. Bituminous coal and iron ore are abundant. The chief productions in 1870 were 23,327 bushels of wheat, 294,863 of Indian corn, 27,131 of oats, 21,759 of potatoes, 68,967 lbs. of butter, 17,022 of wool, 58,230 of tobacco, and 1,039 tons of hay. There were 1,398 horses, 1,827 milch cows, 4,344 other cattle, 9,723 sheep, and 10,120 swine. Capital, Wayne Court House. **IV.** An E. county of North Carolina, intersected by the Neuse river; area, 720 sq. m.; pop. in 1870, 18,144, of whom 8,140 were colored. The surface is generally level and the soil sandy. Extensive pine forests cover much of the county, and large quantities of lumber, tar, and turpentine are exported. It is traversed by the North Carolina, Atlantic and North Carolina, and Weldon and Wilmington railroads. The chief productions in 1870 were 9,413 bushels of wheat, 297,546 of Indian corn, 12,216 of oats, 30,558 of peas and beans, 75,220 of sweet potatoes, 19,960 lbs. of butter, 8,348 of wool, 1,905 of tobacco, 22,996 of rice, and 5,617 bales of cotton. There were 1,162 horses, 2,091 milch cows, 3,810 other cattle, 4,102 sheep, and 16,790 swine. Capital, Goldsboro. **V.** A S. E. county of Georgia, bounded N. E. by the Altamaha, and intersected by the Santilla river; area, 594 sq. m.; pop. in 1870, 2,177, of whom 379 were colored. The surface is level, abounding with pine forests, and the soil sandy. It is traversed by the Atlantic and Gulf, the Brunswick and Albany, and the Macon and Brunswick railroads. The chief productions in 1870 were 19,597 bushels of Indian corn, 7,092 of oats, 18,017 of sweet potatoes. 6,042 lbs. of butter, 8,595 of rice, and 12,518 of honey. There were 257 horses, 2,703 milch cows, 4,457 other cattle, 480 sheep, and 4,905 swine. Capital, Jesup. **VI.** A S. E. county of Mississippi, bordering on Alabama, intersected by the Chickasawha river, and by the Mobile and Ohio railroad; area, 790 sq. m.; pop. in 1870, 4,206, of whom 1,636 were colored. The surface is undulating and the soil sandy. The chief productions in 1870 were 46,819 bushels of Indian corn, 12,947 of sweet potatoes, and 740 bales of cotton. There were 442 horses, 1,594 milch cows, 2,933 other cattle, 1,615 sheep, and 4,506 swine. Capital, Waynesborough. **VII.** A S. W. county of Tennessee, bordering on Alabama, bounded N. W. by the Tennessee river, and drained by Buffalo river and several creeks; area, about 700 sq. m.; pop. in 1870, 10,209, of whom 893 were colored. The surface is hilly and the soil fertile. Iron ore is abundant. The chief productions in 1870 were 47,428 bushels of wheat, 484,861 of Indian corn, 19,314 of oats, 13,887 of Irish and 14,927 of sweet potatoes, 108,030 lbs. of butter, 17,856 of wool, 26,769 of tobacco, and 1,101 bales of cotton. There were 2,500 horses, 2,898 milch cows, 5,558 other cattle, 9,674 sheep, and 24,841 swine; 1 manufactory of pig iron, 1 of cement, 10 tanneries, 10 currying establishments, 5 saw mills, and 2 flour mills. Capital, Waynesborough. **VIII.** A S. county of Kentucky, bordering on Tennessee, bounded N. by Cumberland river, and E. by South fork; area, 570 sq. m.; pop. in 1870, 10,612, of whom 675 were colored. The surface is hilly, and the soil, especially along the streams, very fertile. Bituminous coal and iron ores are very abundant. The chief productions in 1870 were 44,255 bushels of wheat, 414,607 of Indian corn, 79,962 of oats, 24,228 of Irish and 14,787 of sweet potatoes, 214,086 lbs. of butter, 29,910 of wool, and 45,782 of tobacco. There were 2,734 horses, 3,017 milch cows, 6,188 other cattle, 15,659 sheep, and 22,322 swine. Capital, Monticello. **IX.** A N. E. county of Ohio, drained by a branch of the Walhonding river, and by Killbuck creek and other streams; area, 660 sq. m.; pop. in 1870, 35,116. The surface is undulating, and the soil a deep clayey loam of remarkable fertility. Bituminous coal and limestone abound. It is traversed by the Pittsburgh, Fort Wayne, and Chicago, the Cleveland, Mount Vernon, and Delaware, and the Atlantic and Great Western railroads. The chief productions in 1870 were 109,119 bushels of wheat, 920,537 of Indian corn, 897,965 of oats, 43,537 of barley, 166,354 of potatoes, 1,117,442 lbs. of butter, 297,383 of wool, 13,300 of tobacco, and 55,881 tons of hay. There were 11,430 horses, 12,218 milch cows, 13,613 other cattle, 69,227 sheep, and 35,746 swine; 3 manufactories of agricultural implements, 26 of carriages and wagons, 2 of dressed flax, 4 of iron castings, 2 of machinery, 1 of paper, 1 of whips, 7 of woollens, 9 flour mills, 13 tanneries, 12 currying establishments, 2 planing mills, and 18 saw mills. Capital, Wooster. **X.** An E. county of Indiana, bordering on Ohio, and drained by Whitewater river and its tributaries; area, 420 sq. m.; pop. in 1870, 34,048. The surface is undulating, and the soil extremely fertile. It is traversed by the Whitewater canal and several railroads. The chief productions in 1870 were 470,641 bushels of wheat, 1,000,160 of Indian corn, 165,100 of oats, 77,290 of potatoes, 319,970 lbs. of butter, 42,038 of wool, 52,330 of tobacco, and 9,214 tons of hay. There were 7,187 horses, 5,442 milch cows, 9,171 other cattle, 11,960 sheep, and 34,390 swine; 6 manufactories of agricultural implements, 14 of carriages and wagons, 2 of iron castings, 8 of machinery, 1 of linseed oil, 5 of woollens, 13 flour mills, 4 tanneries, 4 currying establishments, 1 brewery, and 14 saw mills. Capital, Richmond. **XI.** A S. E. county of Illinois, intersected by the Little Wabash river and its affluent, Skillet fork; area, 720 sq. m.; pop. in 1870, 19,758. The surface is generally level, diversified by prairie and woodland, and the soil is fertile. The Springfield and Illinois Southeastern railroad passes through it. The chief productions in 1870 were 164,955 bushels of wheat, 1,179,291 of Indian corn, 404,482 of oats, 69,872 of potatoes, 233,295 lbs. of butter, 72,355 of wool, 541,605 of tobacco, and 20,130 tons of hay. There were 7,890 horses, 1,296 mules and asses, 5,843 milch cows, 10,524 other cattle, 28,967 sheep, and 39,427 swine; 25 manufactories of carriages and wagons, 10 flour mills, 17 saw mills, and 2 woollen mills. Capital, Fairfield. **XII.** A S. E. county of Michigan, bordering on Lakes Erie and St. Clair, bounded E. by Detroit river and S. W. by Huron river, and drained by Rouge and Huron rivers and their branches; area, 600 sq. m.; pop. in 1870, 119,038; in 1874, 144,903. The surface is undulating in the W. part and level in other portions, and the soil is very fertile. Limestone of a superior quality is found, and there are sulphur springs. It is traversed by several railroads terminating at Detroit. The chief productions in 1870 were 239,501 bushels of wheat, 413,284 of Indian corn, 477,321 of oats, 28,068 of barley, 28,295 of buckwheat, 440,569 of potatoes, 891,305 lbs. of butter, 60,850 of cheese, 204,543 of wool, and 57,367 tons of hay. There were on farms 10,118 horses, 11,927 milch cows, 8,465 other cattle, 42,683 sheep, and 12,655 swine. The whole number of manufactories was 1,191; capital invested, $14,732,160; value of products, $26,217,685. Most of them are in the capital, Detroit. **XIII.** A S. county of Iowa, bordering on Missouri, and drained by the South fork of the Chariton river; area, 510 sq. m.; pop. in 1870, 11,287. The surface is undulating and the soil very fertile. The chief productions in 1870 were 109,702 bushels of wheat, 560,828 of Indian corn, 184,531 of oats, 39,260 of potatoes, 230,975 lbs. of butter, 50,570 of wool, 5,049 of tobacco, and 19,291 tons of hay. There were 4,418 horses, 3,627 milch cows, 7,453 other cattle, 18,750 sheep, and 14,142 swine; 1 woollen mill, 1 flour mill, and 3 saw mills. Capital, Corydon. **XIV.** A N. E. county of Nebraska, drained by affluents of Elkhorn river; area, about 450 sq. m.; pop. in 1870, 182; in 1875, 431. The surface consists of rolling prairies, and the soil is productive. Capital, La Porte. **XV.** A S. E. county of Missouri, watered by the St. Francis, Big Blackwater, and Castor rivers; area, 750 sq. m.; pop. in 1870, 6,068, of whom 67 were colored. The surface is undulating, and the soil in some parts fertile. Timber is scarce. Mingo swamp extends into the S. E. border. The chief productions in 1870 were 23,819 bushels of wheat, 293,569 of Indian corn, 31,121 of oats, 8,380 of Irish and 3,739 of sweet potatoes, 54,309 lbs. of butter, 11,803 of wool, and 47,054 of tobacco. There were 1,781 horses, 1,636 milch cows, 3,435 other cattle, 7,133 sheep, and 16,259 swine. Capital, Greenville.

WAYNE, Anthony, an American soldier, born in Chester co., Pa., Jan. 1, 1745, died at Presque Isle (Erie), Dec. 14, 1796. His grandfather, a native of England who settled in Ireland, commanded a squadron of dragoons in the battle of the Boyne, and his father served in several expeditions against the Indians. Anthony was educated at the Philadelphia academy, and became a surveyor. He visited Nova Scotia in 1765–'6 as agent for a land company, and in 1767 married and settled on a farm in his native county. In 1774 he was a member of the Pennsylvania convention, and was elected to the legislature. In 1775 he was a member of the committee of safety, and in September he raised a regiment of volunteers, with which, being commissioned as colonel, he joined Gen. Sullivan in Canada in the spring of 1776. He was conspicuous in the battle of Three Rivers, and was afterward placed in command of the fortresses of Ticonderoga and Mount Independence. In May, 1777, he was made a brigadier general, and joined Washington in New Jersey. At the battle of Brandywine (Sept. 11) his command opposed all day the passage of the river at Chadd's ford by Howe's right wing, and at sunset retreated. On the 20th Wayne was suddenly attacked and defeated near Paoli. At Germantown he led the attack of the right wing. During the winter of 1777–'8 he made a raid within the British lines, and captured a large amount of cattle, horses, and forage. His skilful manœuvring at Monmouth was especially commended in Washington's report of that battle. In the night of July 15–16, 1779, Wayne surprised and captured the garrison of Stony Point on the Hudson (see Stony Point), for which brilliant achievement he received the thanks of congress and a gold medal. In leading the attack he was wounded in the head. In January, 1781, he skilfully suppressed a serious mutiny at Morristown. In February he was ordered to join the southern army, and at Jamestown ford, Va., July 6, by a prompt attack he saved Lafayette's forces from disaster. He assisted in the capture of Cornwallis, and soon after was assigned to command in Georgia, where he routed large bodies of Indians on their way to reënforce the British, and drove the enemy from the state. The legislature gave him a vote of thanks and a large tract of land. After the war he retired to his farm. In April, 1792, he was appointed major general and commander-in-chief in the war against the western Indians; and he gained a signal victory over the Miamis in August, 1794. He was shortly afterward appointed sole commissioner to treat with the Indians of the northwest, and to take possession of all forts held by the British in that territory, and died while returning from this expedition. On account of his bravery and apparent rashness he was popularly called "mad Anthony Wayne." His life by John Armstrong is included in Sparks's "American Biography" (1st series, vol. iv.).

WAYWODE (Slav. *voi* or *woy*, war, and *vodit* or *wodzić*, to lead), a title formerly borne in Slavic countries by military leaders, who were also frequently governors of provinces, hence, as in Poland, called waywodeships. The governors of Moldavia and Wallachia, in the earlier history of those countries called waywodes, afterward took the Greek title *despota*, and finally the Slavic *hospodar*. The title waywode (Hun. *vajda*) was also in use in Hungary and Transylvania; and Serb Woiwodina (Serb Waywodeship) was the name of a division of Austria established by Francis Joseph in 1849, and abolished in 1860. It included the Banat and the county of Bács.

WEAK FISH, or Squeteague, a spiny-rayed fish of the genus *otolithus* (Cuv.), resembling the perch. It has numerous teeth in the jaws, some having the form of elongated, hook-like canines; the head is convex, supported by cavernous bones; the air bladder has a horn on each side projecting forward. The common weak fish (*O. regalis*, Cuv.) is between 1 and 2 ft. long, brownish blue above, with irregular brownish spots, and tinged with greenish and banded in the young; the sides silvery, abdomen white, and iris yellow; lower fins orange; no barbels on chin, and bones of anal fin weak; there is a single row of very small teeth in the upper jaw, and a double series in the lower; dorsals separated, and the second, with the caudal and anal, mostly covered with scales. This was formerly one of the most common marine fishes in Vineyard and Long Island sounds, but is now less abundant; it has been taken in the gulf of St. Lawrence and the gulf of Mexico; it often accompanies the bass (*labrax*). The flesh is wholesome and well flavored, but so quickly gets soft that it does not rank high in the market. The air bladder makes excellent isinglass for culinary purposes.



Common Weak Fish (Otolithus regalis).

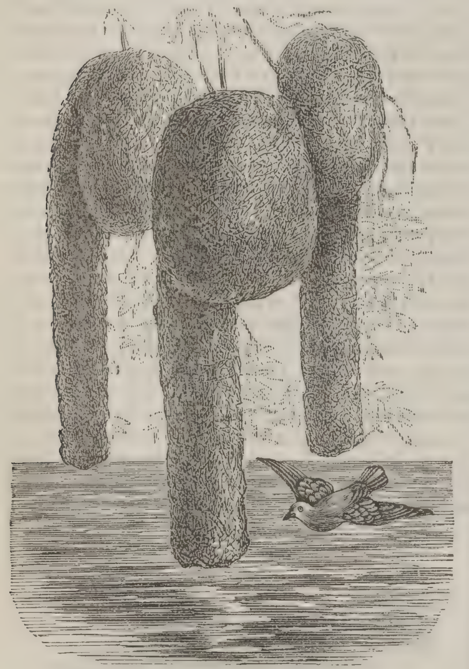
WEAKLEY, a N. W. county of Tennessee, bordering on Kentucky, drained by tributaries of the Obion river; area, about 550 sq. m.; pop. in 1870, 20,755, of whom 3,899 were colored. The surface is nearly level, and the soil fertile. It is intersected by the Nashville, Chattanooga, and St. Louis railroad. The chief productions in 1870 were 136,298 bushels of wheat, 279,544 of Indian corn, 5,933 of Irish and 10,282 of sweet potatoes, 258,295 lbs. of butter, 20,056 of wool, and 2,599,590 of tobacco. There were 3,914 horses, 2,673 mules and asses, 4,062 milch cows, 4,913 other cattle, 13,034 sheep, and 38,935 swine; 4 flour mills, 1 cotton mill, and 10 saw mills. Capital, Dresden.

WEASEL, the general name of the carnivorous mammals of the family *mustelidæ*, including many genera approaching the cats in bloodthirstiness. Most of these have been described under BADGER, ERMINE, FERRET, FISHER, GLUTTON, MARTEN, MINK, OTTER, POLECAT, SABLE, and SKUNK; indeed, most of the American weasels will be found under ERMINE and MINK, the latter being the type of Cuvier's genus *putorius*, since divided into three by Wagner. The head is short and rounded; the dental formula is: incisors $\frac{3-3}{3-3}$, canines $\frac{1-1}{1-1}$, premolars $\frac{3-3}{3-3}$, and molars $\frac{1-1}{2-2}=\frac{16}{18}$ or 34, being one premolar fewer on each side, above and below, than in the less carnivorous genus *mustela* (Linn.); ears short and round; feet five-toed, with sharp claws; hair fine and soft. They are small, with elongated bodies and short legs, giving them a peculiar gliding serpentine motion; they are very active, preying on small quadrupeds and birds, and so eager for blood that they kill indiscriminately all the animals they can overpower, usually breaking in at once the skull of their victims; they are sometimes destructive among poultry, their slender form enabling them to penetrate through very narrow openings; when alarmed or irritated, they exhale a disagreeable odor. Our common or least weasel (*P. pusillus*, Aud. and Bach.) is only 6 in. long, with a tail of 1 in., slender and not tufted nor tipped with black; it is dark brown above, the lower parts, inside of limbs, and upper lip white, this color extending high up on the sides; it becomes white, according to Richardson, in the fur countries during winter, but remains brown above all the year in the United States; it extends from New York to Minnesota and northward. The common European weasel (*P. vulgaris*, Cuv.), *la belette* of the French, is 6 or 7 in. long, with a tail of 2 in. more; it is reddish brown above, the upper part of tail like back, but lower surface white; it is said to become all white in winter in the far north. It is found throughout temperate Europe, generally near the abode

Common European Weasel (Putorius vulgaris).

of man; it is very agile and bold; it feeds upon moles, mice, and small birds, and is rather beneficial than injurious to the farmer. It much resembles the preceding species, but is lighter colored and has a longer tail. The bridled weasel (*P. frenatus*, Aud. and Bach.), 11½ in. long, chestnut brown above and yellowish white below, nearly black on the head, with three white marks, between the eyes and in front of each ear, abounds in Texas and Mexico, about the Rio Grande.

WEAVER BIRD, the common name of the finches of the family *ploceinæ*, so called from the remarkable manner in which they weave their nests from various vegetable substances, presenting some of the finest specimens of bird architecture. They have a strong bill, with the base projecting upon the forehead and the tip entire; wings rounded, with first quill very short; legs and feet stout, and hind toe long. Most are African, but a few of the genus *ploceus* (Cuv.) are found in the East Indies and the Indian archipelago; they feed on insects and seeds. Their nests are usually suspended from the end of a slender twig or palm leaf, frequently over the water and the aperture almost touching it, so as to be beyond the reach of monkeys, snakes, and other climbing enemies; they are usually shaped like a pouch, from the side or bottom of which a tubular appendage is prolonged downward, the entrance being at the bottom. Some species attach their nests each year to the bottom of those of the preceding; the *ploceus pensilis* (Cuv.) in this way sometimes places five nests in succession below each other; this bird is greenish above, grayish below, with red vent, and black quills and tail. The social or republican weaver (*philetærus socius*, Gray) is about 6½ in. long, reddish brown above and yellowish below; it inhabits the interior of S. Africa, building in large societies a compound nest on the mimosa trees, whose smooth trunk prevents the ascent of most noxious animals; the nests are made of a fine grass closely woven, and so arranged that 800 to 1,000, each with three or four eggs, are supported on a single tree, covered with a roof 10 to 12 ft. in diameter; on the under surface of this umbrella-like, thatched roof, or, according to Paterson, around the edges and opening into a common passage, are numerous entrances to the nests, which are placed about 2 in. apart; they do not occupy the same nest for two years, but add on new nests to the lower surface of the old ones until the tree is broken down by the accumulated weight.—In this family belong the Whydah finches or widow birds, of the genus *vidua* (Cuv.); these are abundant about Whydah in W. Africa, whence the first name, which has been happily corrupted into the common English name, their sombre colors and long black trail well entitling them to the epithet widow birds. In the paradise widow bird (*V. paradisea*, Cuv.) two of the middle tail feathers of the male in the breeding season are a foot long, and two others shorter but with broad webs; these fall off after the breeding season. The head, chin, fore neck, back, wings, and tail are black; neck all round orange of various shades, and most of the other parts white; it is about as large as a canary, and is a favorite cage bird both for its beauty and its song; it is found from Senegal to S. Africa.



Nest of African Weaver Bird.

WEAVING, the art of combining threads, filaments, or strips, of various nature or material, in the way of interlacing them to form cloth, or other web or woven fabric, by means of a loom. Though the Egyptian looms, as depicted on tombs at Thebes and elsewhere, were very simple, yet the fabrics produced in them were often fine and costly. In some of them the warp extended horizontally, as now; in others it was vertical, and the weft was driven upward. In the most ancient mummy cloths the texture is close, firm, and elastic. Weaving was also practised very early in Greece and Asia Minor, both as a domestic employment and as a trade. Homer describes as the product of Creüsa's shuttle a figure-woven pattern, in which appeared a gorgon and dragons. The damasks, shawls, and tapestries woven by the later Greeks and by the Romans would rival in beauty some of the best productions of the modern art. In more modern times, the people of Italy and of the Netherlands appear first to have become famed for their textile manufactures; and from these countries the trade passed to England and France. Edward

III., and afterward Elizabeth, are said to have laid the foundation for that prominence in textile manufactures for which England is still distinguished.—In ordinary or plain weaving, two distinct series or sets of threads or yarns, that traverse the web at right angles to each other, are to be distinguished. The first is the series of threads running the whole length of the piece or web to be produced, and most commonly known as the warp; the second, generally called the weft or woof, is the series of threads crossing and interlacing with the warp, and is in effect one continuous thread passing at one throw alternately over and under the warp threads from one side of the piece to the other, and at the return throw also alternately, but on the reverse sides of the same warp threads; and so on, from the beginning until the whole length of the warp threads becomes a woven piece or cloth. In all styles of weaving, the warp threads are first affixed upon the proper parts of the loom; while the weft is wound in single threads on many small spools or bobbins, which are set one after another, as required, in a small hollowed and boat-shaped instrument, the shuttle; this, being thrown back and forth between the warp threads, parted as presently to be described, delivers the weft by its unwinding from the bobbin.—The frame of the ordinary hand loom consists of four upright posts joined by cross beams, at the middle, and at top and bottom. The centre beam, or cylinder, at the back of the loom, is the warp beam. The centre beam in front, just above the weaver's seat, is the cloth beam, on which the piece is to be wound. Just below the cloth beam, in front, is the breast beam, against which the weaver may lean in working. By a cross piece at top, with pulleys and cords, the two leaves of heddles or healds are suspended a little way back from the cloth beam; these being attached respectively to opposite ends of the same cords, and below to treadles on which the feet rest, the pressing down of either treadle depresses the leaf of heddles corresponding, and elevates the other. The leaves are light vertical frames, extending the width of the piece, each having ranged along it the heddles, or equidistant vertical twines, in number answering to half the required number of warp threads, and each twine having at the middle a loop or eye through which a warp thread is to be passed. In plain, as in all other modes of weaving, it is necessary first to lay together in the loom the number of threads requisite to form the width of the cloth; this is called warping, and was at one time done by use of a simple arrangement known as a warping frame. The more convenient "warping mill" was afterward introduced. In "beaming," the threads are wound as evenly as possible on the warp beam of the loom by passing them between the teeth of a comb, or of an instrument known as a ravel or separater. The next operation is that of "drawing," in which the warp threads are passed from the warp beam in their proper order through the loops of the respective heddles, from one side to the other, and attached forward along the cloth beam. By this arrangement, at each depression of one treadle, the corresponding half of the threads is carried down, the other half of them raised; and between the cloth beam or edge of the cloth already woven in front, and the heddles behind, the parted sets of threads thus leave a triangular space or opening, called the shed, through which the weaver throws or otherwise drives the shuttle from side to side of the piece. Just in front of the heddles, and back of the path of the shuttle, is suspended the batten, lay, or lathe, a movable frame having its axis at the top of the loom; the vertical rods forming its sides are the swords; its bottom is the shuttle race, the ends of which, just beyond the sides of the piece, are closed so as to form short troughs, in which the shuttle is arrested and started again at either side; while its middle portion is a sort of upright comb, the reed, having a tooth rising between every two consecutive threads. By seizing this batten and bringing it forward sharply after each thread or weft has been deposited, the weaver drives up the thread to its place in the cloth. However improved or complicated the loom, the principle of weaving is in all forms substantially that now described.—Before warping, the yarn is commonly sized, as by dipping sufficiently in size of starch, wringing and drying; and in weaving cotton or other yarns, these often require to be dressed as the weaver proceeds, being rubbed at intervals, as they are unrolled from the beam, with some mucilage or size, then brushed or combed, and dried by fanning; in this way the yarns are made more smooth and tenacious. For weaving broad goods, four, six, or even eight yards in width, much dexterity and precision is requisite in the throwing of the shuttle with sufficient and not too much force; while in the so-called engine loom, for weaving narrow webs, such as ribbons and galloons, several shuttles work as many webs at the same time. It is only in the simplest mode of hand weaving that the shuttle is still thrown alternately by the two hands. About 1740 John Kay invented the fly shuttle; in this mode, a continuous firm cord has a wooden handle, or "picking peg," at its middle, and placed conveniently in front of the weaver; the ends of the cord act on "pickers," one in each trough or box at the ends of the shuttle race, these pickers lying beyond or outside the shuttle, and either one impelling it by being slidden along a horizontal wire at a jerk given with the picking peg to the cord in that direction; by this means the hand weaver moves the shuttle both ways with the right hand, while he manages the batten with the left. Stripes across the piece are obtained by changing of shuttles, so as to employ the different colors or yarns as often as the proper widths of stripe are produced. This changing of shuttles was inconvenient and wasteful of time, until Robert Kay, son of the inventor of the fly shuttle, contrived the drop box; in this, two, three, or more boxes, one over the other, at each side of the shuttle race, are so connected by a cord on which is a convenient handle, that, by moving this, one is made to slide down and the other up the swords of the batten; the boxes at one side have in them each a shuttle with one color of thread, and by moving them any required one is brought at once to the level of the shuttle race, so that its shuttle shall be next acted on by the picking peg and cord; and in this way the colors and stripes are changed at the will of the workman, or in power looms by some device changing the boxes at the proper intervals.—In the Jacquard apparatus, which can be attached to almost any kind of loom, a hollow prismatic box, extending the width of the fabric, has each of its sides perforated, in the direction of its length, with a number of straight rows of holes, corresponding, as each face is presented to the fabric, accurately with the points of as many rows of metallic bars, called needles. Each of these needles is pressed toward the box by a spiral spring, and each has passing through a loop in its length a lifting hook, which takes up, when lifted, its proper thread of the warp. These rows of lifting hooks terminate above also in hooks; and an arrangement of lifting bars is let down after each throw of the shuttle, to engage these upper hooks, raise the lifting hooks, and with them the warp threads. The prismatic box has also a reciprocating movement, by which at the same moments its sides are brought up to the ends of the needles; and it turns to present a new face at each movement. If all the needles enter the holes of the box, all the lifting hooks are in position, and are engaged by the lifting bars as they descend, and all the warp threads are raised. But the weaving of complicated figures, such as those of carpets, tapestries, or shawls, requires that, through a certain cycle of movements of the shuttle, new groups of the warp threads continually shall be elevated. To determine, then, the groups of threads that shall be elevated, a succession of stiff cards looped together to form an endless chain of any required length, and all of size and form corresponding to those of a side of the perforated box, are made to move successively over the box, one lying flat upon it at each of its movements. Now, the order and groups of threads raised are simply determined by perforating these cards beforehand, and in succession, with groups of holes that shall precisely correspond only with the threads to be lifted for that part of the pattern. When the box now advances upon the needles, those meeting the unperforated portions of the card are forced back, their lifting rods are moved out of position, and only the threads answering to the needles that enter the holes are raised. With the use of this apparatus, it is only necessary further to arrange properly the succession of colors to appear in the weft, or in both warp and weft. Some improvements of the apparatus for particular uses have been made by English manufacturers. (See Jacquard.)—Not quite two centuries have passed since the origination of the first power loom, by M. de Gennes, a French naval officer of some distinction, who communicated his plan to the French academy of sciences in 1678. The advantages of productiveness, economy, uniformity of product, and convenience of weaving broad fabrics, which he claimed, are those practically realized and most important at the present day; but his loom was not brought into use. His account was translated in the same year for the "Philosophical Transactions;" and during a century or more several English inventors brought out power looms, none of which were generally adopted. The first successful power loom was the invention of the Rev. Edmund Cartwright (1784–'5). A principal cause which long delayed the adoption of these looms was the necessity for stopping the machine frequently, to dress the warp as unrolled from the beam; the employment for this purpose of a man for each loom prevented any saving of expense. In 1802 Mr. Radcliffe and Thomas Johnson, of Stockport, England, obviated this difficulty by producing the dressing machine in use in modern factories, by which the dressing of the warp is completed before it goes into the loom, being, during one operation, sized, brushed, dried, and distributed on the warp beam. Later, Messrs. Horrocks and Marsland, also of Stockport, further completed the adaptation of the looms for being driven by steam; and Mr. Roberts, of Manchester, brought the working parts of the looms to nearly their present perfection. The frame of the power loom is of cast iron, and of great strength. The breast beam and cloth beam are situated much as in the hand loom. The warp beam, at the back of the loom, is at the level of the breast beam, and is kept back by a weight, while above and parallel with it, at the level of the cloth beam, is a roller over which the warp threads are passed, so as to lie on the loom in a horizontal direction. The heddles, for broad or heavy cloths, are so suspended by levers and cords that the depressing of one raises the other; for light goods, a pair of rollers with cords suffices. To work the heddles, there are on a shaft running transversely across the loom two eccentric wheels on tappets differently set, the rims of which run on friction rollers fixed on levers of the third kind, pivoted at one end to the frame, while the movable end of each connects with one of the heddles. When the longer radius of either eccentric is down, the shorter of the other is so, and the lever and heddle corresponding to the former are depressed. Into the shed of the warp thus formed the shuttle is thrown by a sharp jerk communicated to it alternately from either side, by means of a single whip lever at the centre of the loom, and moving a picking cord, or by means of two levers with short cords at the two sides; motion being in either case communicated to these at the proper moments by the mechanism. Thus, in the use of the single cord, the driving shaft in each loom, which in all cases derives its power through a band from the common shaft directly impelled by the engine, imparts motion to a second shaft running across the loom below it; while on this two rollers are so affixed, that one of them at each half turn of the shaft suddenly strikes down a roller on one side of the whip lever, and so, shortening another cord at this part, draws the lever and picking cord with a sharp jerk in the corresponding direction; the cord, acting on pickers as before explained, gives the throw to the shuttle. The stroke of the batten or lay, beating up the weft threads, is accomplished by means of cranks on the driving shaft, which so connect with arms projecting from the upright pieces of the batten (in these looms pivoted to the frame below) as to draw the batten forward after every throw of the shuttle. The connection of the shafts in the loom with each other, and with the cloth beam, to which a slow movement is imparted, is by toothed wheels, of such size as to give to each the required rate of speed. Among the late improvements in the power loom are those by which the loom is stopped when the weft thread breaks or is absent, when the driving band is shifted, and when the shuttle does not get clear of the shed; that in which the tension of the warp is obtained, not by a weight, but by springs fixed to the framing; and that of Mr. Ingram (1860) for resupplying the loom with weft as often as the bobbin or cop is exhausted, or when the thread is only broken.—The expense of material and time in preparing the cards for the Jacquard apparatus, which for the heaviest work must be of sheet iron, and for all intricate patterns very numerous, has always constituted the most serious drawback upon the desirableness of that method. Thus, an elaborate damask design has required 4,000 cards and 400 needles, at a cost of about $120, and five weeks' labor of a man in setting up; while a single design has been known to require 20,000 cards, at a cost of $600, and time equal to a year's labor of one man. With a view to reduce greatly these expenditures, M. Bonelli first constructed in 1854, and has since much improved, his "electric loom." In this, the cards of Jacquard's apparatus are superseded by an endless band of paper covered with tin foil, intended to serve as an electrical conductor; accordingly, the unperforated portions of the cards are here represented by non-conducting patches of black varnish, laid on with a brush. The band passes steadily along, under the points of rows of metallic rods or teeth. Each of these teeth connects with a small coil or helix, within which is a soft-iron bar. A frame capable of swinging slightly is situated in front of the ends of these bars, having a plate in it perforated with a corresponding number and order of holes, within and through which as many iron rods abutting at one end against the bars already named can move with a little friction, like as many piston rods through stuffing boxes. The tin foil band being put in connection with a galvanic battery, with the other pole of which the remote ends of all the helices connect, all the metal teeth at a given time resting upon the bare foil conduct portions of the current, render the bars in their helices magnets, and by their action withdraw the corresponding rods out of the plate, leaving so many holes open; while the rods answering to the teeth that are on the varnished portions of the foil remain in and close the other holes. In this way, this single plate is made to serve for the endless succession of Jacquard cards; the needles entering these holes determining as before what warp threads shall be raised. By means of insulated strips of foil running along the back of the tin foil band, and connected with certain portions only of its face, separated by narrow insulating breaks, different colors or sorts of weft can be successively worked into the piece, according to the strips of foil successively put in connection with the battery. In another improvement of the Jacquard loom, a sheet of prepared paper punched with the proper apertures is substituted for the cards of the old machine; this paper being in form of a continuous band, only three fourths of an inch wide, so that the weight of the new is to that of the old band as but 1 to 11. The arrangement is also such as permits the 400 spiral springs in connection with the needles in the old machine to be dispensed with. Thus the wear and tear due to the resistance of these is done away with, and fine and light wires are introduced in lieu of the heavy ones previously employed. Various additions have also been made to the Jacquard loom by Barlow, Taylor, Martin, and others.—American inventions in connection with the improvement of the power loom have been very numerous, but comparatively few radical changes have been introduced. In 1857 Mr. E. B. Bigelow of Boston patented a method of weaving pile fabrics double, by means of transverse intersecting pile wires woven between the two fabrics so as to keep them properly apart, with movement at the same time of two shuttles, and an arrangement connecting each shuttle with the shipper or disconnecting lever of the loom, so that, when the filling fails in either shuttle, the loom is thrown out of gear. An invention by Joseph Fish of New York was patented Oct. 26, 1875, which is especially applicable to the weaving of broad silk with figures of different colors and of various patterns. Its main object is to produce a power loom which shall not only provide for the control of the Jacquard machine or pattern-controlling device, but also "for the driving of the supplementary shuttles, and otherwise actuating them or such portions of their attachments as require to be operated by the loom itself without the intervention of the Jacquard or pattern mechanism." The devices which control the operation of the fly shuttles are also applicable to all drop-box looms. (See also CARPET, COTTON MANUFACTURE, DAMASK, LINEN, RIBBON, SILK, TAPESTRY, VELVET, and WOOL, MANUFACTURES OF.)

WEBB, a S. county of Texas, bounded W. by the Rio Grande, which separates it from Mexico; area, about 1,200 sq. m.; pop. in 1870, 2,615, of whom 2 were colored. The inhabitants are mostly Mexicans, chiefly engaged in stock raising, but some land is cultivated in the valley of the Rio Grande. In 1870 119,260 lbs. of wool were produced. There were 1,259 horses, 2,947 milch cows, 7,691 other cattle, and 71,730 sheep. Capital, Laredo.

WEBB. I. Samuel B., an American soldier, born in Weathersfield, Conn., Dec. 15, 1753, died at Claverack, N. Y., Dec. 3, 1807. Hearing of the battle of Lexington, he went to Boston in command of a company of light infantry, was engaged and wounded at Bunker Hill, was subsequently aide to Gen. Putnam, and on June 21, 1776, became private secretary and aide-de-camp to Gen. Washington. He was engaged in the battle of Long Island, wounded at White Plains and again at Trenton, and was in the action at Brandywine. In 1777 he raised the third Connecticut regiment, which under his command became a part of Gen. Parsons's expedition to Long Island, and which was captured, Dec. 16, 1777, by the British fleet. Col. Webb was not exchanged till 1780, when he took command of the light infantry, with the brevet rank of brigadier general. After the war he resided in New York till 1789, when he removed to Claverack. **II. James Watson**, an American journalist, son of the preceding, born in Claverack, N. Y., Feb. 8, 1802. He entered the army as second lieutenant in 1819, and became first lieutenant in 1823, assistant commissary of subsistence in 1824, and adjutant of the third regiment in 1826. In 1827 he resigned and became editor of the "New York Courier." In 1829 he purchased the "Enquirer," and united the two under the name of the "Morning Courier and New York Enquirer," which journal he owned and edited till July, 1861, when it was merged in the "World." During the existence of the whig party the "Courier and Enquirer" was a leading advocate of its principles. In June, 1842, he fought a duel in Delaware with Thomas F. Marshall of Kentucky, and was wounded; he was indicted in November by the New York grand jury "for leaving the state with the intention of receiving or giving a challenge," pleaded guilty, was sentenced to two years' imprisonment at Sing Sing, and was almost immediately pardoned by Gov. Seward. In 1843 he was appointed engineer-in-chief of the state of New York, with the rank of major general. In 1849 he was appointed by President Taylor minister to Austria, but was rejected by the senate. In 1861, after declining the mission to Constantinople, he was appointed by President Lincoln minister to Brazil, in which office he negotiated the settlement of long standing claims against that country. He resigned the Brazil mission in 1869 and returned to New York in 1870. He has published "Altowan, or Incidents of Life and Adventure in the Rocky Mountains" (2 vols., New York, 1846); "Slavery and its Tendencies" (Washington, 1856); and a pamphlet, "A National Currency" (New York, 1875).

WEBBE, Samuel, an English composer, born in Minorca in 1740, died in London in 1824. He learned the trade of cabinet making, but afterward studied music, and at the age of 26 gained a prize from the catch club for a canon. He rose into eminence as a composer of glees, catches, and canons, a collection of which, numbering over 100 compositions, was published in three volumes. He also wrote masses, anthems, single songs, and other miscellaneous pieces.

WEBER, a N. county of Utah, bordering on Great Salt lake, and intersected by Weber river; area, 540 sq. m.; pop. in 1870, 7,858. It is traversed by the Central and Union Pacific and the Utah Central railroads. The centre is mountainous, and the streams flowing from this region toward the lake irrigate and render productive large tracts. The chief productions in 1870 were 53,272 bushels of wheat, 8,478 of Indian corn, 5,151 of barley, 15,607 of potatoes, and 12,760 lbs. of butter. There were 929 horses, 1,118 milch cows, 591 other cattle, 1,473 sheep, and 145 swine; 6 saw mills, and 1 woollen mill. Capital, Ogden City.

WEBER. I. Ernst Heinrich, a German physiologist, born in Wittenberg, June 24, 1795. He studied at Leipsic, wrote *Anatomia Comparata Nervi Sympathici* (Leipsic, 1817), and was made in 1818 adjunct professor of comparative anatomy, afterward titular professor, and in 1840 also of physiology. His principal works are: *De Aure et Auditu Hominis et Animalium* (Leipsic, 1820); *Zusätze zur Lehre vom Bau und von der Verrichtung der Geschlechtsorgane* (1846); and *Annotationes Anatomicæ et Physiologicæ* (1851). **II. Wilhelm Eduard**, a German physicist, brother of the preceding, born in Wittenberg, Oct. 24, 1804. He was educated at Halle, and in 1825 published in connection with his brother *Die Wellenlehre*, a standard treatise on the liquid fluidity of waves and its connection with waves of sound and light. In 1827 he was appointed assistant professor of natural philosophy at Halle, and in 1831 professor of physics at Göttingen, from which latter office he was displaced by the Hanoverian government in 1837 for his liberal political opinions. In 1843 he was appointed to the chair of physics in Leipsic, where he remained till 1849, when he was reinstated at Göttingen. With Gauss he published the *Resultate aus den Beobachtungen des magnetischen Vereins* (1837 *et seq.*), accompanied by an *Atlas des Erdmagnetismus* (1840), which has been the means of founding a new theory on terrestrial magnetism. From 1846 to 1867 Weber published a series of treatises under the title *Electrodynamische Massbestimmungen.* **III. Eduard Friedrich,** a German physiologist, brother of the preceding, born in Wittenberg, March 10, 1806, died in Leipsic, May 18, 1871. From 1835 till his death he was professor of medicine at Leipsic. He wrote in conjunction with his brother Wilhelm *Mechanik der menschlichen Gewerkzeuge* (Göttingen, 1836), and published several treatises on the functions of the muscles.

WEBER, Albrecht Friedrich, a German orientalist, born in Breslau, Feb. 17, 1825. He studied in that city, in Bonn, and under Bopp in Berlin, where he became in 1856 extraordinary and in 1867 full professor of ancient Indian languages and literature. He is one of the foremost Sanskrit scholars of the present day, and his *Indische Studien* (10 vols., Berlin, 1849–'67) abound with original information in regard to the metrical system and other departments of Indian antiquity. He has edited the "White Yajur-Veda" (3 vols., Berlin, 1849–'59), translated Indian dramas, and published many other works, including *Akademische Vorlesungen über indische Literaturgeschichte* (1852); *Die vedischen Nachrichten von den Naxatra* (2 vols., 1860–'61); *Ueber ein Fragment der Bhagavatî* (2 vols., 1865–'8); *Ueber das Râmâyana* (1870); and *Ueber ein zum weissen Yajus gehöriges phonetisches Compendium des Pratijnâsûtra* (1872).

WEBER, Karl Maria Friedrich Ernst von, baron, a German composer, born at Eutin near Lübeck, Dec. 18, 1786, died in London, June 5, 1826. His father, who was a musician, gave him a liberal education and afforded him the means for studying music and painting. He was taught first by the pianist Hauschkel of Hildburghausen, and afterward by Michael Haydn. In 1798 Weber's first productions, six fughetti, were published by his father. He soon went to Munich, where he received lessons in singing from Valesi, and in composition from Kalcher, the organist of the court chapel. Here he composed works which he subsequently destroyed. His fondness for pictorial art was revived by the discovery of lithography, to which he gave himself up for a considerable time, endeavoring to effect improvements upon the original invention. But in 1800 he returned to the study of music, and produced an opera called *Das Waldmädchen.* In 1801 he composed *Peter Schmoll und seine Nachbarn,* which met with slight success. In 1802 he went to Vienna, where he remained two years, studying with the abbé Vogler. He next became chapelmaster at Breslau, where he hastily composed an opera called *Rübezahl.* In 1806 he entered into the employment of Prince Eugene of Würtemberg, and produced at Carlsruhe in Silesia two symphonies and a number of less important works. The troubles of the period compelling him to abandon this situation, he resided for a while at Stuttgart as private secretary with the dissolute Prince Louis of Würtemberg, for whom he rewrote *Das Waldmädchen,* under the new title of *Sylvana.* In 1810 he began a professional tour of the principal cities of Germany. At Darmstadt he composed *Abu Hassan.* From 1813 to 1816 he conducted the opera at Prague, and afterward was manager of the German opera at Dresden until his death. In 1822 he produced at Berlin his principal work, *Der Freischütz,* which has since held its place on the operatic stage. In 1823 *Euryanthe* was first performed at Vienna, with less success. In 1824, soon after the reproduction of his *chef d'œuvre* in England, he was applied to by Charles Kemble for an opera for London; and on April 12, 1826, *Oberon* was first represented at the Covent Garden theatre. Weber himself conducted the performance, and was saluted with unprecedented ardor. He died suddenly of consumption at the house of his friend Sir George Smart, and was buried at Moorfields, whence his remains were in 1844 removed to Dresden.—Weber's mind was sensitive and poetic, and he found congenial material in the musical treatment of subjects in which the fanciful legendary and supernatural elements predominate. Such a subject was presented in *Der Freischütz,* and his scene in the wolf's glen in that opera is one of the boldest and most original pieces of musical coloring that any composer of this century has produced. He took rank at the head of the so-called romantic school. He possessed great harmonic invention and a vein of fresh and beautiful melody. The character of Agatha in *Der Freischütz* is one of the most firmly drawn and beautiful pieces of musical portraiture known to the operatic stage. His influence on the pianoforte playing of his day was also considerable, and many of his compositions of that class, such as his *Concertstück* and his "Invitation to the Waltz," are examples of fine melodic invention, beauty of form, and delicate fancy. He left also a number of literary compositions relating to musical subjects. His life, in three volumes, by his son Max Maria von Weber, has been translated into English by J. Palgrave Simpson (2 vols., London, 1865).

WEBSTER, the name of seven counties in the United States. **I.** An E. central county of West Virginia, drained by Gauley and Elk rivers, tributaries of the Kanawha; area, about 400 sq. m.; pop. in 1870, 1,730. The surface is generally very hilly, and in some parts mountainous. Iron ore and bituminous coal are abundant. The chief productions in 1870 were 1,196 bushels of wheat, 21,075 of Indian corn, 4,686 of oats, 2,340 of potatoes, 14,563 lbs. of butter, 4,598 of wool, 2,508 of tobacco, and 504 tons of hay. There were 359 horses, 643 milch cows, 769 other cattle, 2,018 sheep, and 1,136 swine. Capital, Webster Court House. **II.** A S. W. county of Georgia, drained by affluents of the Flint and Chattahoochee rivers;

area, about 325 sq. m.; pop. in 1870, 4,677, of whom 2,238 were colored. The surface is undulating and the soil fertile. The chief productions in 1870 were 1,421 bushels of wheat, 86,810 of Indian corn, 11,041 of sweet potatoes, 14,958 lbs. of butter, and 3,167 bales of cotton. There were 270 horses, 580 milch cows, 1,355 other cattle, 458 sheep, and 4,625 swine. Capital, Preston. **III.** A N. W. parish of Louisiana, bordering on Arkansas; area, about 550 sq. m.; pop. in 1875, 9,522, of whom 5,282 were colored. It is intersected from N. to S. by Bayou Dauchite, which empties into Lake Bistineau in the S. part. The surface is rolling, and consists largely of prairies; the soil is productive. Capital, Minden. **IV.** A N. W. county of Kentucky, bounded N. E. by Green river, and drained by its tributaries; area, about 290 sq. m.; pop. in 1870, 10,937, of whom 1,355 were colored. It has a diversified surface and a fertile soil. The Green river is rendered navigable by slackwater improvements. The St. Louis and Southeastern railroad crosses the E. part. The chief productions in 1870 were 39,771 bushels of wheat, 221,679 of Indian corn, 21,765 of oats, 9,602 of Irish and 7,310 of sweet potatoes, 42,660 lbs. of butter, 21,994 of wool, 3,511,649 of tobacco, and 1,379 tons of hay. There were 2,965 horses, 2,233 milch cows, 2,931 other cattle, 10,549 sheep, and 16,673 swine. Capital, Dixon. **V.** A central county of Iowa, intersected by the Des Moines river, and also drained by Lizard river and other branches of that stream; area, 1,080 sq. m.; pop. in 1870, 10,484. The surface is diversified by prairie and woodland, and the soil is tolerably fertile. It is traversed by the Des Moines Valley and the Illinois Central railroads. The chief productions in 1870 were 155,385 bushels of wheat, 301,176 of Indian corn, 98,763 of oats, 25,523 of potatoes, 221,990 lbs. of butter, 8,829 of wool, and 23,378 tons of hay. There were 2,435 horses, 2,357 milch cows, 4,087 other cattle, 3,160 sheep, and 3,304 swine. Capital, Fort Dodge. **VI.** A S. county of Nebraska, intersected by Republican river, and bordering on Kansas; area, 576 sq. m.; pop. in 1870, 16; in 1875, 2,590. The surface consists chiefly of undulating prairies; the soil is productive. Capital, Red Cloud. **VII.** A S. W. county of Missouri, drained by several branches of the Gasconade and White rivers; area, about 575 sq. m.; pop. in 1870, 10,434, of whom 248 were colored. The surface is undulating and the soil fertile. Iron ore is found. The Atlantic and Pacific railroad passes through it. The chief productions in 1870 were 73,581 bushels of wheat, 288,918 of Indian corn, 76,568 of oats, 17,872 of potatoes, 97,765 lbs. of butter, 18,538 of wool, 143,162 of tobacco, and 1,746 tons of hay. There were 3,318 horses, 2,487 milch cows, 4,383 other cattle, 10,545 sheep, and 15,985 swine; 3 wool-carding and cloth-dressing establishments, 5 flour mills, and 4 saw mills. Capital, Marshfield.

WEBSTER, Benjamin, an English actor, born in Bath, Sept. 3, 1800. He was educated for the navy, and also studied music, but in 1825 went upon the stage in London. In 1837 he became manager of the Haymarket theatre, and during his lesseeship expended annually large sums for original works by Bulwer, Knowles, Jerrold, and others, which were brought out at his theatre, where at the same time appeared Macready, Wallack, Farren, Miss Faucit, and other eminent actors. Subsequently he had the management of the Adelphi theatre. In 1858 he built the new Adelphi theatre, which is still under his management (1876). In 1866 he became also lessee of the Olympic. He is president of the new dramatic college. His most successful parts are Lavater, Tartuffe, Belphegor, Triplet, and Pierre Lereux in the "Poor Strollers."

WEBSTER, Daniel, an American statesman, born in Salisbury (now Franklin), N. H., Jan. 18, 1782, died at Marshfield, Mass., Oct. 24, 1852. He was the second son of Ebenezer Webster and his second wife, Abigail Eastman. (See WEBSTER, EBENEZER.) The schools on the frontier in his childhood (Salisbury being then the furthest settlement toward Canada in this part of New England) were very indifferent; and the best part of his early education was probably derived from his father and mother. In 1796 he was sent to the Phillips Exeter academy. While there, as he relates, he could never muster courage to make a declamation, but in other respects he gave decided promise of future eminence. In February, 1797, he was placed in the family of the Rev. Samuel Wood, of the town of Boscawen, and in the autumn entered Dartmouth college, where he partly supported himself and aided his elder brother Ezekiel to prepare for college by teaching school in winter. He read widely, especially in history and general English literature, laid a good foundation in the ancient languages, which enabled him to read the Latin classics with pleasure through life, and delivered addresses before the college societies, some of which found their way into print. By the close of his first year he had shown himself decidedly the foremost man of his class, and that position he held through his whole college course. He graduated in 1801, and immediately entered the law office of Thomas W. Thompson, his father's next-door neighbor, who was afterward a congressman and United States senator. From January to September, 1802, he was principal of the Fryeburg academy, Maine, at a salary of $350 a year, which he supplemented by copying for the register of deeds, filling two folio volumes. He afterward remained with Mr. Thompson till February, 1804, when he went to Boston and through a friend procured the charge of a school for his brother Ezekiel. With the aid which the latter was thus enabled to afford him, he entered the office of Mr. Christopher Gore, afterward governor of Massachusetts and

United States senator, to complete his legal studies. With him he remained, though not continuously, from July, 1804, to March, 1805. Mr. Webster justly regarded his admission to Mr. Gore's office as "a good stride onward." It was a situation which gave him the means of studying books, and things, and men. While there he made reports of every case decided in the supreme court of Massachusetts, and in the circuit court of the United States. Shortly after his arrival in Boston his brother returned to Dartmouth college, to attend to his graduation, leaving his school to the care of Daniel. In the spring of 1805 he was admitted to the bar of the court of common pleas in Boston. Shortly before he had been offered the clerkship of the court of common pleas of Hillsborough co., N. H. The post was worth $1,500 a year, a large income for the time, and his father, who was a member of the court, wished him to accept it; but Mr. Gore, who foresaw for him a splendid career at the bar, dissuaded him. He practised for a year at Boscawen, and in 1806 was admitted to the superior court of New Hampshire, and established himself at Portsmouth, then the capital of the state. Here he rose at once to full practice at a bar composed of eminent counsel, and attended by others of distinction from Massachusetts.—Mr. Webster came forward in life at a time when party spirit ran high. He had inherited from his father the principles of the federal party, and advocated them in speeches and resolutions on public occasions, but did not for some years embark deeply in politics. The declaration of war in 1812, long foreseen, and deprecated by the federalists, created a demand for the best talent the country could furnish. Mr. Webster had already established a commanding reputation, and in 1812 he was elected to congress. He took his seat in the special session of May, 1813, and in the organization of the house was placed on the committee of foreign affairs. The complications with foreign powers which had brought on the war, and the ways and means for meeting the greatly increased expenditure of the government, were the subjects which principally occupied the house; and in the debates on both Mr. Webster took a leading part. Early in the session he moved a series of resolutions on the repeal of the Berlin and Milan decrees, and on June 10, 1813, delivered his maiden speech on that subject. Proceeding from a person almost wholly unknown at Washington, it took the house and the country by surprise. His subsequent speeches on the increase of the navy, which he warmly recommended, and the repeal of the embargo, placed him in the first rank of debaters. He cultivated friendly relations on both sides of the house, and gained the respect of those most warmly opposed to him in politics. He was reëlected to congress in 1814. In the succeeding session he opposed the bill for a new bank of the United States, which should not be obliged to redeem its notes in coin, in a speech which exhibits a perfect mastery of the abstruse subjects of banking, finance, and currency. The bill was lost by the casting vote of the speaker, but revived on a motion for its reconsideration by Mr. Webster, and so amended that it passed the house by a large majority, and was carried through the senate, but was vetoed by President Madison. In the 14th congress, which met in December, 1815, Mr. Webster took an active part in support of the charter of the bank of the United States, which passed the house in April, 1816. His most important service at this session was the introduction of a resolution requiring all payments to the treasury, after Feb. 20, 1817, to be made in specie or its equivalents. This measure prevailed, and restored the depreciated currency of the country.—In December, 1813, Mr. Webster's house at Portsmouth was burned with all its contents, including his library and the entire fruits of his professional labor. This disaster, together with the limited opportunities afforded in his profession by so small a place, decided him to seek a wider field. Accordingly, at the close of the session in August, 1816, after some hesitation between Boston and Albany, he decided on Boston, in which and its vicinity he made his home, except while officially resident at Washington, till the end of his life. For nearly seven years after his removal, with a single exception, he filled no public office, but devoted himself exclusively to the practice of his profession, taking a position as a counsellor and an advocate above which no one has ever risen in this country. A choice of the best business in New England, and of that of the whole country which was adjudicated at Washington, passed into his hands. Besides the reputation which he acquired in the ordinary routine of practice, Mr. Webster, shortly after his removal to Boston, took a distinguished lead in establishing what might be called a school of constitutional law by his argument in the Dartmouth college case. In 1816 the legislature of New Hampshire passed laws altering the charter of Dartmouth college, enlarging the number of the trustees, generally reorganizing the corporation, and changing its name to Dartmouth university. The newly created body took possession of the corporate property and assumed the management of the institution. The old board brought an action against the treasurer of the new board for the record books, the original charter, the common seal, and other corporate property of the college. The case turned upon the points whether the acts of the legislature were binding upon the old corporation without their assent, and not repugnant to the constitution of the United States. It was argued twice with great ability in the courts of New Hampshire, which decided that the acts of the legislature were constitutional and valid. The case was immediately appealed to Washington, and on March 10, 1818, was argued by Mr. Webster and Mr. Hopkinson of Philadelphia for the plaintiffs, and Mr. John Holmes of Maine and Attorney General Wirt for the defendants, in error. Mr. Webster as junior counsel opened the case, and made a novel and exhaustive argument on the propositions that at common law colleges under ordinary circumstances are private eleemosynary institutions, over which the state has no control except for acts in violation of their charters; and that within the meaning of the constitution of the United States the charter of such an institution is a contract which the legislature of a state cannot annul. The decision of the court was pronounced by Chief Justice Marshall, at the term for 1819, declaring the acts of the legislature of New Hampshire unconstitutional, and reversing the decision of the court below. By this decision the law of the land in reference to collegiate charters was firmly fixed. This case established Mr. Webster's reputation at the supreme court of the United States, and he was thenceforward retained in almost every considerable cause argued at Washington. It will be sufficient to name the cases of Gibbons and Ogden (the great steamer monopoly case), the case of Ogden and Saunders (state insolvent laws), the Charles river bridge case, the Alabama bank case, the validity of Mr. Girard's will, the Rhode Island charter case, and the great India-rubber case argued before the circuit court of New Jersey in the last year of his life. In the trials of Goodridge at Newburyport, shortly after his removal to Boston, and the great *cause célèbre* of Knapp at Salem, Mr. Webster exhibited skill as a criminal lawyer which has never been surpassed.—In 1820 Mr. Webster was a member of the Massachusetts convention to revise the constitution of that state after the separation of Maine. The principal subjects on which he spoke at length were oaths of office, the basis of senatorial representation, and the independence of the judiciary. During its session he pronounced, on Dec. 22, 1820, his celebrated discourse at Plymouth on the anniversary of the landing of the pilgrim fathers. This was the first of a series of performances, apart from the efforts of the senate and the bar, by which he placed himself at the head of American orators. The other addresses of this class were his orations at the laying of the corner stone of the Bunker Hill monument in June, 1825, and at the completion of that structure in June, 1843; the eulogy on Adams and Jefferson in 1826; and his discourse on laying the corner stone of the extension of the capitol in 1851. In the autumn of 1822 he was elected to congress from Boston by a very large majority. Early in the session, commencing in December, 1823, he made his famous speech on the Greek revolution, a powerful remonstrance against the principles of the "holy alliance." The subject of the tariff was discussed at this session, and Mr. Webster opposed an extravagant increase of protective duties. As chairman of the judiciary committee, he reported and carried through the house a complete revision of the criminal law of the United States. The second session of the 18th congress is memorable for the election of John Quincy Adams as president of the United States by the house of representatives. Mr. Webster, as long as he remained a member of the house, was the leader of the friends of the administration in that body. He was reëlected in 1824. In 1827 he was elected by the legislature of Massachusetts to the senate of the United States to fill a vacancy, and retained his seat by reëlection till 1841. The principal topic at the first session of the 20th congress was the revision of the tariff, with special reference at first to protection of the woollen interest. Mr. Webster, in an elaborate argument, showed that a moderate protective system had now become the settled policy of the country; and that the capital invested in manufactures was far too considerable to be exposed to the caprices of the foreign market, fraudulent invoices, and the competition of foreign labor working on starvation wages. The first session of the 21st congress was signalized by the famous debate on Foot's resolution relative to the survey of the public lands, which gradually assumed the character of partisan warfare, and mainly related to the newly promulgated doctrines of the school of Mr. Calhoun on the right of an individual state to nullify an act of congress. Two speeches were made by Mr. Webster, of which the second, pronounced on Jan. 26 and 27, 1830, is the most celebrated of his parliamentary efforts. His first speech was an entirely unpremeditated reply to the first of Mr. Hayne, who endeavored in an elaborate argument to prove that New England had always pursued an unfriendly course toward the western states. Mr. Benton followed Mr. Webster, and Mr. Hayne then claimed the right of rejoinder. His second speech was still more strongly marked with bitterness toward the eastern states, and bordered on the offensive toward Mr. Webster. He also reaffirmed, with great emphasis, the doctrine of nullification. This speech occupied a part of one day and the whole of the next. Mr. Webster began his reply the next day, and completed it the day after. He had a threefold task to perform: first, to repel the personalities toward himself which formed a very prominent part of Mr. Hayne's speech, and this was done by a few retaliatory strokes, in which the keenest sarcasm was so mingled with unaffected good humor and manly expostulation as to command the sympathy of the audience; secondly, to vindicate the eastern states in general, and Massachusetts in particular, which was done with the utmost spirit and effect; and lastly, and what Mr. Webster deemed by far the most important object, to overthrow the doctrine of nullification, as held and expounded by the South Carolina school. The senate chamber was crowded to its utmost capacity on both days, and certainly a more brilliant parliamentary success was never achieved. At the close of the second day Mr. Hayne attempted a reply. He spoke only about half an hour, principally in answer to Mr. Webster's constitutional argument, and reaffirming the South Carolina theory; but the report of the speech filled 19 columns in the public journals. Mr. Webster made a brief rejoinder, including a recapitulation of his own argument, which for condensation and force may be cited as a specimen of parliamentary logic never surpassed. The speech was more widely circulated throughout the country than any that had ever before been made, and except in South Carolina was universally considered as having given the *coup de grâce* to the doctrine that it is competent for an individual state to annul an act of congress. From this time to the accession of Gen. Harrison to the presidency in 1841, the principal occurrences were the breaking up of the combinations which had borne Gen. Jackson into the presidency; the rejection of Mr. Van Buren's nomination as minister to England by the united votes of Messrs. Webster, Clay, and Calhoun, and their friends; the bill to recharter the bank of the United States, and its veto by President Jackson; the ordinance of nullification adopted by South Carolina; the force bill in congress; the compromise tariff of Mr. Clay; the removal of the public deposits from the bank of the United States and their distribution among the local banks; the resolution of the senate disapproving of that measure, and the message from the president protesting against the resolution; the expunging resolution; the election of Mr. Van Buren to the presidency; the financial crisis of 1837, and the extra session of congress occasioned by it, with the new government plan of finance. These events furnished the topics of a series of debates in the senate, in all of which Mr. Webster took a leading part. Mr. Webster's argument on what was called the "subtreasury" system of the administration was the most elaborate and effective of his speeches on the currency.—In the spring of 1839 Mr. Webster crossed the Atlantic and made a hasty tour in England, Scotland, and France. Returning in the early winter, he yielded the most efficient aid in bringing about the great political change which was consummated in the election of Gen. Harrison to the presidency. His own name had been prominently brought forward as candidate for vice president, but, in conformity with the almost invariable usage of the political parties, it was deemed expedient that the candidates for the two offices should not be from the same section of the Union. On this ground Mr. Webster withdrew his name, and that of Mr. Tyler was substituted. Gen. Harrison, as soon as it was ascertained that he was elected, offered to Mr. Webster the choice of places in his cabinet. The condition of the foreign relations of the country was extremely critical, and it was finally decided that he should take charge of the department of state. Harrison's death and the succession of Mr. Tyler to the presidency menaced the harmony of the administration, and finally overturned it; but no changes took place immediately. Our relations with England demanded prompt attention. The differences between the two governments relative to the northeastern boundary, which for nearly two generations had tasked to the utmost the resources of diplomacy, the affair of the Caroline and McLeod, and the detention and search of American vessels by British cruisers on the coast of Africa, were subjects of controversy which imperatively demanded a peaceful solution. Fortunately a change of ministry took place in England at the end of August, 1841, and the new administrations in both countries were able to address themselves to the difficult task of a comprehensive settlement. Lord Ashburton was sent as a special envoy to the United States, and in a few months a convention was agreed upon equally advantageous and honorable to both parties. Mr. Webster retired from the administration of Mr. Tyler in the spring of 1843, the other members of the cabinet having resigned their places in the preceding summer. His continuance in office after the president's change of policy had been severely blamed in some quarters; but the critical state of foreign relations and Mr. Tyler's undiminished confidence in him were deemed sufficient justification by the more moderate of his party. He remained in private life during the residue of Mr. Tyler's administration, for the first time in 20 years, occupied more than ever with professional duties. In the autumn of 1844 he supported Mr. Clay's nomination to the presidency. The question at issue was the annexation of Texas, and was decided in favor of that measure by the election of Mr. Polk. At the first session of the 29th congress (December, 1845) Mr. Webster took his seat in the senate of the United States, as the successor of Mr. Choate. He opposed the annexation of Texas as unconstitutional, but he thought it his duty, after the war with Mexico was actually commenced, not to withhold the supplies which were required for the sustenance and reënforcement of our troops. His second son, Edward, obtained a major's commission in Gen. Scott's army, and died in the city of Mexico. The Oregon boundary question was settled at this time, and Mr. Webster, though holding no executive office, was able, through private channels of influence in England, to contribute materially to this result. In the spring of 1847 he set out upon a visit to the southern states, where he was uniformly received with cordiality, especially at Charleston, Columbia, Augusta, and Savannah. At Savannah he was threatened with severe illness, and obliged to abandon the further prosecution of his tour. In the course of this year the Mexican war was brought to a triumphant close. Mr. Webster, foreseeing that the territory acquired by the treaty of Guadalupe Hidalgo (1848) would prove a Pandora's box of evil to the country, voted against its confirmation. The great popularity of Gen. Taylor led to his nomination as the candidate of the whig party at the ensuing presidential election. The friends of Mr. Webster had calculated, with some confidence, that the choice of the nominating convention would fall upon him; but nothing occurred to prevent him and his friends from giving a cordial support to Taylor's administration. The controversies relative to slavery had become violent beyond former example, in consequence of the recent territorial acquisitions. California, having without previous congressional sanction adopted a constitution by which slavery was prohibited, was applying for admission to the Union; New Mexico was to be organized as a territory; a claim was set up by Texas to an extensive region on her border; while at this inauspicious season a more stringent law for the extradition of fugitive slaves was demanded by the south. The excitement in congress and through the country had reached a dangerous height, and a national crisis seemed to be impending. A series of compromise measures was at length adopted in congress, by which the threatened catastrophe was for the time averted. In the progress of the senatorial debates on these subjects, Mr. Webster delivered his much criticised speech of the 7th of March, 1850, in which he abandoned the Wilmot proviso and justified the fugitive slave law. In making this concession for the sake of conciliation, he was not without melancholy forebodings of its failure to unite even the unanimous suffrage of his political friends. While the compromise measures were still before congress, about midsummer of 1850, President Taylor died. In the reorganization of the cabinet by President Fillmore, Mr. Webster was called to the department of state. The movements of the filibusters against Cuba, successful attempts in different parts of the country to resist the execution of the fugitive slave law, the arrival in America of Kossuth and the other Hungarian exiles, the apprehensions of a collision with the British cruisers on the fishing grounds, the affair of the Crescent City at Havana, the misunderstanding with Peru relative to the Lobos islands, the Japanese expeditions, the proposed tripartite guaranty of Cuba, the reciprocity treaty relative to the Canadian provinces, and the affairs of Central America were the subjects which engaged the attention of Mr. Fillmore's administration while Mr. Webster remained in charge of that department. On July 4, 1851, he delivered an address at the laying of the corner stone of the extension of the capitol, which was his last discourse of this kind. In January, 1852, he argued the important India-rubber patent cause at Trenton. This was his last great forensic effort. In the spring of that year the whig presidential convention assembled at Baltimore. Sanguine hopes were entertained by the friends of Mr. Webster, but the choice of the convention fell upon Gen. Scott. Early in May Mr. Webster was seriously injured by being thrown from his carriage near his farm in Marshfield. In June he went back for a short time to Washington, but his health required, in addition to a cooler climate, the repose which he could only find at home. He made another short visit to Washington in August. The few closing months of his life were passed at Marshfield. The last matter of public business which engaged much of his attention was the affair of the American fisheries off the coasts of the British provinces. After his final return from Washington chronic complaints gained rapidly upon him. Sensible that his failing health did not admit the punctual discharge of the duties of his office, he tendered his resignation, which was declined by Mr. Fillmore. His funeral was attended at Marshfield in the presence of a great part of the population of that place and the neighboring towns, of a large number of persons from Boston and other parts of Massachusetts, and of deputations from New York, Albany, and Philadelphia. Funeral orations, discourses, and sermons were delivered throughout the country, in great numbers.—Mr. Webster's person was imposing, of commanding height and well proportioned; his head of great size; his eyes deep-seated, large, and lustrous; his voice powerful, sonorous, and flexible; his action, without being remarkably graceful, was appropriate and impressive. He went to bed and rose early, and despatched the business of the day as much as possible during the morning hours. He was extremely fond of field sports, particularly fishing, and was a remarkably good shot. His social tastes were very strong, and his conversational powers have rarely been equalled. His happiest days were passed upon his farms. He understood agriculture theoretically and practically, and took great pride in his fine stock and large crops. He was a regular attendant on public worship. Portraits at different periods of his life by the most distinguished artists of the day, and his bust by Powers, will convey to posterity no inadequate idea of his countenance and form. Mr. Webster was married in early life to Grace Fletcher of Hopkinton, N. H. Of this marriage were born Charles, Julia, Edward, and Fletcher, of whom the last, the only one who survived him, fell as colonel of the 12th Massachusetts volunteers in the battle of Aug. 29, 1862, near Bull Run. Mr. Webster's first wife died in January, 1828, and in December, 1829, he married Caroline Bayard Le Roy, daughter of an eminent merchant in New York, who survives him.—Several editions of his collective works were published during his lifetime, the most complete in 6 vols. 8vo (1851). Two volumes of his private correspondence were published by his son in 1858. His biography has been written by

George Ticknor Curtis (2 vols., New York, 1869). See also "Daniel Webster and his Contemporaries," by the Hon. C. W. March (New York, 1876).

WEBSTER. I. Ebenezer, an American patriot, father of Daniel Webster, born in Kingston, N. H., in 1739, died in Salisbury (now Franklin), N. H., in 1806. He served under Gen. Amherst in the "old French war," and in 1761 was one of the original settlers of that part of the town of Salisbury now known as Franklin, then the northernmost New England settlement. He was a farmer and innkeeper, and at the outbreak of the revolution led the Salisbury militia to Cambridge. Subsequently he fought at White Plains and Bennington, was at West Point during the treason of Arnold, and served in other campaigns until the close of the war, when he had attained the rank of colonel of militia. He was at various times a member of one or the other branch of the legislature, and from 1791 till his death was judge of the court of common pleas of Hillsborough co. **II. Ezekiel,** eldest son of the preceding by his second wife, born in Salisbury, March 11, 1780, died in Concord, April 10, 1829. He graduated at Dartmouth college in 1804, studied law, and rose to eminence in his profession. He also served in the state legislature. He died instantaneously of disease of the heart while trying a cause in Concord.

WEBSTER, John, an English dramatist, in the latter part of the 16th and the first half of the 17th century. He was a friend and contemporary of Decker, Drayton, and Middleton, with whom, particularly Decker, he was jointly engaged in the production of plays. His own dramas comprise "The White Devil" (1612), "The Duchess of Malfey" (1623), and "Appius and Virginia" (1624). His works were edited by the Rev. A. Dyce (4 vols., London, 1830), and by W. Hazlitt (4 vols., 1857).

WEBSTER, Noah, an American philologist, born in that part of Hartford, Conn., now forming the town of West Hartford, Oct. 16, 1758, died in New Haven, May 28, 1843. He entered Yale college in 1774, served under his father, a captain in the militia, during the campaign of 1777, and graduated in 1778. He taught school in Hartford, and was admitted to the bar in 1781. In 1782 he opened a classical school at Goshen, Orange co., N. Y. Having determined to engage in the preparation of school books, and received encouragement from Mr. Madison and others on a visit to Philadelphia, he returned to Hartford, and in 1783 published his "First Part of a Grammatical Institute of the English Language," which was followed in the course of the next two years by the second and third parts. This "First Part" was the basis of the spelling books which he afterward published. About the same time he undertook the publication of "Governor Winthrop's Journal." He also wrote newspaper articles upon questions of national policy. In 1785 he published a pamphlet entitled "Sketches of American Policy," in which he foreshadowed the character of a new constitution of the United States. The same year he visited the southern states, to procure the enactment of state copyright laws. In 1786 he delivered a course of lectures in the principal American cities on the English language, which were published in 1789, under the title of "Dissertations on the English Language." In 1787 he became principal of an academy in Philadelphia; and when the labors of the constitutional convention were closed, he wrote a pamphlet entitled "Examination of the Leading Principles of the Federal Constitution." In 1788 he established in New York, and published for one year at a heavy loss, the "American Magazine." He returned to Hartford in 1789, and began the practice of law. For some years his business was large and profitable; but in the autumn of 1793, at the solicitation of friends of the administration, he established for its support a daily newspaper in New York, "The Minerva," to which he added soon after a semi-weekly edition, called "The Herald." These names were subsequently changed for those of the "Commercial Advertiser" and "New York Spectator," which are still retained (1876). In 1795 he contributed to his journal papers under the signature of "Curtius," in defence of Jay's treaty with Great Britain, concluded in the preceding year, which did much to allay the violent opposition to that treaty. In 1799 he published "A Brief History of Epidemics and Pestilential Diseases" (2 vols. 8vo, Hartford), which he had been led to investigate by the prevalence of yellow fever. He had removed to New Haven in 1798, having resigned the editorial charge of his journal, though he retained the proprietorship for some time. In 1802 he published a work on the rights of neutral nations in time of war, and a compilation of "Historical Notices of the Origin and State of Banking Institutions and Insurance Offices;" and in 1807 his "Philosophical and Practical Grammar of the English Language." He had published in 1806 a "Compendious Dictionary," and in 1807 he began the preparation of the "American Dictionary of the English Language." He soon found himself seriously embarrassed for want of a knowledge of the origin of words, and therefore laid aside his work, and spent ten years in an inquiry into the origin of our language and its connection with those of other countries. He then commenced anew his dictionary, brought it nearly to a close in seven years, and sailed for Europe in June, 1824. After spending two months in Paris, examining rare works in the royal library, he went to England, and, in a residence of eight months at the university of Cambridge, completed the dictionary. At the close of the year 1828 an edition of 2,500 copies was published in the United States, in 2 vols. 4to, followed by one of 3,000 in England. In 1840 a second edition of 3,000 copies was published, in 2 vols. royal 8vo. In the interval several editions of the dictionary, abridged to a greater or less degree, had been prepared either by Mr. Webster or members of his family. While preparing his great work, he removed his residence to Amherst, Mass., and was one of the founders of Amherst college, and for several years president of its board of trustees. He also represented the town for several years in the legislature. In New Haven he had been repeatedly a member of the legislature of the state, and judge of one of the state courts. He returned to New Haven in 1822, and in 1823 received from Yale college the degree of LL. D. In the beginning of 1843 he published "A Collection of Papers on Political, Literary, and Moral Subjects," and an elaborate treatise "On the supposed Change in the Temperature of Winter," which he had read before the Connecticut academy of sciences 44 years before. His last literary labor was the revision of the appendix to his dictionary, which he completed only a few days before his death. (See DICTIONARY, vol. vi., p. 95.) Of his "Elementary Spelling Book," in its various editions and revisions, more than 70,000,000 copies had been sold down to January, 1876. The annual sale of the dictionaries has been for some years over 300,000 copies. Besides the works named above, Dr. Webster published in early life a "History of the United States," which he revised about 1838; "Letters to a Young Gentleman commencing his Education" (8vo, New Haven, 1823); "Manual of Useful Studies" (New Haven, 1832); "The Prompter;" and a "History of Animals."

WEBSTER, Thomas, an English painter, born in London, March 20, 1800. He became a student of the royal academy in 1820, exhibited a portrait group in 1823, and in 1841 was elected an associate, and in 1846 an academician. He is known by his pictures of children and of school life. Among the best of these are his "Smile" and "Frown," engraved for the art union in 1841, "Going to School" (1842), "See-Saw," and "Slide" (1849). The national collection contains his "Sickness and Health" (1843), "Dame's School" (1845), and "Village Choir" (1847). Among his other paintings are "The Peddler" (1844), "Good Night" (1846), "Dotheboys Hall" (1848), "School Playground" (1852), "The Race" (1855), "Hide and Seek" (1856), and "The Tempter" (1857).

WEDDERBURN, Alexander, Baron Loughborough and earl of Rosslyn, a British jurist, born in Edinburgh, Feb. 13, 1733, died in Berkshire, Jan. 3, 1805. He was admitted to the bar at the age of 19, in 1753 became a member of the Inner Temple, London, and in 1757 was called to the English bar and rapidly gained a high reputation. He obtained a seat in parliament, and on Jan. 26, 1771, was appointed solicitor general in the ministry of Lord North, in which office he was conspicuous for his defence of Lord Clive. In January, 1774, when the petition of Massachusetts for the removal of Hutchinson and Oliver was laid before the privy council, Wedderburn defended those functionaries in a speech in which he made an insulting attack upon Franklin, the agent of the petitioners. He was a strong support to the ministry of Lord North during the revolutionary war. In 1778 he was made attorney general, and in 1780 chief justice of the court of common pleas, when he was raised to the peerage. In April, 1783, he assisted in forming the famous coalition ministry, in which he was appointed first commissioner of the great seal; and after its dissolution he remained out of office until Jan. 27, 1793, when he became lord high chancellor under Mr. Pitt. On his resignation of that office in 1801, he was created earl of Rosslyn.

WEDGE. See MECHANICS, vol. xi., p. 328.

WEDGWOOD, Josiah, an English potter, born in Burslem, Staffordshire, July 12, 1730, died at Etruria, near Newcastle-under-Lyme, Jan. 3, 1795. He received but little education, and about the age of 10 worked at the wheel in his brother's pottery in Burslem. He established an independent business in 1759, entered upon the manufacture of ornamental pottery, and brought himself into notice by the production of a peculiar cream-colored ware known as "queen's ware." He next opened a warehouse in London, and produced numerous imitations of antique vases, medallions, &c. He made 50 copies of the Portland vase, sold at 50 guineas each, introduced many original and beautiful designs, including several by Flaxman, and experimented with various kinds of clay and coloring substances, raising British pottery to the position of a fine art. As early as 1771 he removed his factories to Etruria, a village erected by himself, where he built a handsome seat. He cultivated natural philosophy with great ability, and contributed papers to the "Transactions" of the royal society, of which he was a fellow.—His life has been written by Eliza Meteyard (2 vols., London, 1865–'6). See also her "Memorials of Wedgwood" (new ed., 1875), and "Wedgwood Handbook" (1875).

WEDNESDAY (Anglo-Saxon, *Wodnesdæg*), the fourth day of the week, named from Woden (A. S.) or Odin, the principal god of Scandinavian mythology.

WEED, Thurlow, an American journalist, born at Cairo, Greene co., N. Y., Nov. 15, 1797. He learned printing in the office of Machy Croswell at Catskill. In the war of 1812 he served on the northern frontier as a private and as quartermaster sergeant. After becoming of age he established the "Agriculturist" at Norwich, Chenango co., N. Y., and during the next ten years edited various journals, the last being the "Anti-Masonic Enquirer," published in Rochester. During the anti-masonic excitement in New York in 1826–'7, he identified himself with the party opposed to the masons, and was twice elected by it to the lower house of the state legislature. His tact as a party manager, and his services in 1826 in securing the election of De Witt Clinton as governor, suggested him as a competent person to oppose the "Albany regency," who had the general management of the democratic party in New York. At the expiration of his second term in the legislature in 1830, he accordingly removed to Albany, and assumed the editorship of the "Albany Evening Journal," a newspaper established in the interest of the anti-Jackson party. From 1830 to 1862 he was a political leader, first of the whig and afterward of the republican party. He was prominent in procuring the presidential nominations of Harrison, Taylor, and Scott, acting in each instance as an independent adviser of the respective conventions. He warmly advocated the election of Fremont in 1856 and of Lincoln in 1860, although his influence had in each case been exerted in favor of the nomination of Mr. Seward. In November, 1861, he was sent to Europe by President Lincoln in a semi-diplomatic capacity. He returned home in June, 1862, and shortly afterward withdrew from the editorship of the "Evening Journal." In 1865 he became a resident of New York city, where he edited for a time the "Commercial Advertiser." Since 1868 infirm health has compelled him to withdraw from active labor. He has published "Letters from Europe and the West Indies" (Albany, 1866), and is preparing for the press his autobiography and correspondence, portions of which have appeared in various publications.

WEEK (Anglo-Sax. *weoc*), a period of seven days, a division of time adopted by the ancient Egyptians and Hebrews, and in general use among Christians and Mohammedans. Its origin is referred back in one part of the Mosaic account (Exod. xx. 11) to the creation of the world, in another (Deut. v. 15) to the exodus from Egypt. Josephus, Philo Judæus, Clement of Alexandria, and others, speak of the week as not of Hebrew origin, but common to all the oriental nations. It was not in use by the Greeks and Romans, until adopted by the latter at the period of the introduction of Christianity, after the reign of Theodosius. Its adoption was no doubt hastened by the peculiar convenience of such a division of the lunar month into four parts, and by its being so nearly an aliquot part of the solar year of 365 days. The only explanation of the origin of the names given to the days is that by Dion Cassius in his Roman history (l. xxxvii., c. 18, 19). They were founded, he says, upon the names of the seven planets known to the ancient Egyptian astronomers, which they arranged as follows in the order of their distances from the earth, beginning with the most distant: Saturn, Jupiter, Mars, the sun, Venus, Mercury, and the moon. According to the ancient astrology, each of these planets presided in turn over the successive hours of the day, and each day was named from the planet to which its first hour was dedicated. Beginning with Saturn, on the first hour of the first day, and allotting to each hour a planet in the order named, the first hour of the second day, it is found, would fall to the sun, of the third day to the moon, of the fourth to Mars, of the fifth to Mercury, of the sixth to Jupiter, and of the seventh to Venus. The Latins adopted these designations in their names of the days of the week, as *dies Saturni*, *dies Solis*, *dies Lunæ*, &c.; and modern nations have retained the same terms, those speaking languages of the Teutonic stock substituting in some cases the names of their own divinities for the corresponding ones of Roman mythology. In the ancient Brahmanical astronomy, the week is also a recognized division of time, and the names of the days are from the same planets and in the same order as those in use by the ancient Egyptians; but the week began with them with *Sukravâra*, the day of Venus or Friday. The Egyptian week began, according to Dion Cassius, on Saturday. This day was also the sabbath of the Jews. Each day being ruled by its particular planet, astrologers assigned to each a particular character; and they may naturally have regarded the day ruled over by Saturn, the most sluggish and gloomy-looking of the planets, as at once a day of rest and a *dies infaustus*, when all work would be unfortunate. The Chinese and Thibetans have a week of five days, named after the five elements, iron, wood, water, feathers, and earth.

WEENIX, or **Weeninx, Jan Baptist**, called the Old, a Dutch painter, born in Amsterdam in 1621, died near Utrecht in 1660. He was instructed by Abraham Bloomaert and Nicholas Moojaert, spent four years in Italy, and was especially distinguished for his pictures of Italian seaports with architectural accessories, embarkations, &c., but excelled also in history, landscapes, portraits, and animals.—His son, JAN the Younger (1644–1719), excelled in dead game and hunting scenes, and painted also landscapes, animals, flowers, and fruit.

WEEVIL, a name applied indiscriminately to insects of the moth, fly, and beetle orders, numbering thousands of species. The term is more properly restricted to the larvæ of the tetramerous beetles of the tribe *rhynchophora*, in which the front of the head is prolonged into a snout, at the end of which the mouth is placed. These insects are diurnal, slow, timid, and defenceless, and the larvæ are soft, white, and footless, with hard heads, very convex rings, and strong horny jaws; they live usually in the interior of the stem, fruit, or seeds of plants, to which they are very injurious. The grain weevil of Europe (*calandra* [*sitophilus*] *granaria*, Linn.) is one of the most mischievous; it is a slender, red beetle, about an eighth of an inch long; the eggs are deposited in the wheat after it is stored, and the grubs as soon as hatched burrow in, each occupying a single grain and eating it so as to leave only the husks in a large heap; the destruction is usually not discovered until it is too late to remedy it. Indian corn and rice are attacked by similar species of the genus. Drying the grain in kilns seems to be the only method of destroying these insects.—The *balaninus nucum* (Germ.) is the parent of the nut weevils, the little white grubs so often seen in filberts and other nuts in Europe. The female by her long proboscis makes a small hole in the young nut when it is soft, and therein deposits an egg, the grub eating its way to the interior and there living to maturity; it then gnaws its way out, falls to the ground, burrows, and undergoes its change to a pupa at the beginning of the next summer. To the species of our hazelnut Say gave the name of *nasicus;* it is $\frac{3}{10}$ of an inch long, dark brown with rusty yellow hairs.—The pea weevil (*bruchus pisi*, Linn.), or pea bug, is about a tenth of an inch long, rusty black with a white spot on the hind part of the thorax and white dots on the wings. The perfect insect is found in the flowers; the eggs are laid in the young pods of peas and beans just opposite the seeds, into which the larvæ at once penetrate; they are said not to touch the germ of the pea, though all the rest is devoured. Peas in the winter often contain these larvæ, but not when a year old; they are killed by soaking in hot water a minute or two just before planting; the crow blackbird and Baltimore oriole devour great numbers of them. This species probably originated in America, in the northern parts of which it is common, whence it has spread to central Europe. Lentils and other leguminous plants are attacked by other species.—The palm weevil or worm (*calandra palmarum*, Clairv.) is about 1½ in. long and black; the larvæ are between 2 and 3 in. long, and live in the pith of the palm, especially the cabbage palm, making a cocoon of the surrounding fibres; they are dirty yellow with a black head, looking like moving pieces of fat, and are esteemed as delicacies in the West Indies. With the larvæ of another species (*C. sacchari*, Clairv.), equally destructive to the sugar cane, these are eaten by the natives of the West Indies and Guiana, boiled, roasted, or broiled on wooden spits, with dried and powdered bread. —There are many weevils attacking resinous trees, among which one of the most destructive is the pine weevil (*curculio* [*hylobius*] *pales*, Herbst), a quarter to a third of an inch long, deep chestnut brown with a few yellowish white dots and lines. Thousands of acres of pines in the southern states have been destroyed by these insects; the best way to prevent their ravages is to protect the woodpeckers, their natural enemies. The *rhynchænus strobi* (Peck) is about a quarter of an inch long, brown with many rusty white scales; they devour the leading shoot of the white pine, whose growth produces the lofty and straight trunk of this beautiful tree; the larvæ are destroyed by woodpeckers and ichneumon flies. Other destructive species are found on European pines. The plum weevil is described under CURCULIO. (See Kollar's and Harris's works on insects injurious to vegetation.)

Pea Weevil (Bruchus pisi).

WEGEFARTH, an unorganized N. W. county of Texas, in the "panhandle;" area, 3,600 sq. m. It is drained by the forks of Red river. The W. part is hilly; the rest consists of undulating prairies.

WEIGELA, a shrub introduced from China by Robert Fortune, named *Weigela rosea* by Thunberg, after Weigel, a German botanist. It is not sufficiently distinct from a much older genus, *Diervilla*, after a French surgeon named Dierville, who early in the last century carried the plant to Tournefort from Canada. Being the older, *Diervilla* must be taken as the correct botanical name of these shrubs, but weigela, being so thoroughly established, must serve as the common name. *Diervilla* differs from the honeysuckle (*Lonicera*) in its slender calyx lobes, its nearly regular corolla, and the fruit, which in the honeysuckle is a berry, but in this is a many-seeded, two-valved pod. We have two native forms, popularly known as bush honeysuckle. The northern species, *D. trifida*, is quite common in the middle and northern states, extending to Hudson bay, and westward to the Rocky mountains; it is a neat bush, 1 to 4 ft. high, with oblong-ovate, taper-pointed, petioled leaves, and pale yellow flowers, usually three on a stalk, from the axils of the upper leaves and terminal. The southern bush honeysuckle, *D. sessilifolia*, found along the southern Alleghanies, has sessile leaves and many flowers upon a stalk. These are far less showy than those from Japan and China. The no-

Rose Weigela (Diervilla rosea).

menclature of these is in much confusion. The one first introduced as *W. rosea*, now called by some *D. Japonica*, has given origin to many varieties; it grows about 5 ft. high, with numerous erect stems, ovate-lanceolate, serrate leaves, and a profusion of rosy or nearly white flowers, an inch or more long. What is called *D.* (or *Weigela*) *amabilis* is much taller, with recurving branches and larger leaves. Both of these have given varieties, and there has been much crossing, so that the list of named sorts is long; they differ in the color and abundance of their flowers, and there are two with variegated foliage. Among the desirable varieties are *hortensis nivea*, with pure white flowers and blooming a long time; *Isoline*, with white flowers having a yellow blotch in the throat, and changing to blush; and *Desboisii*, with flowers of the deepest rose color, and so abundant as to make the stem a continuous garland. Others are described in the catalogues, and new varieties are frequently added. These plants are perfectly hardy, and multiplied by cuttings from the recent shoots taken just as they begin to harden.

WEIGHING MACHINES, contrivances for ascertaining the measure of gravity (or weight) of different bodies. The simplest and most accurate form of weighing machine is the common balance, a lever of the first kind with equal arms. This may be made sensitive to within less than $\frac{1}{6000}$ of a grain. (See Balance, vol. ii., p. 234.) Weighing machines in which a small weight may be made to counterpoise a large one may be in the form of the steelyard, which is a lever of the first kind with the two arms in varying proportions, one arm being sometimes 300 times as long as the other, so that a two-pound weight would be capable of balancing and therefore measuring the weight of a body of 600 lbs. Compound levers are usually employed for heavy goods, arranged in the form of what are called platform scales. They are used in the weighlocks of canals for weighing boats (see Canal, vol. iii., p. 681), and in market places for weighing car and dray loads. The arrangement is shown in the article Mechanics, vol. xi., p. 327. Machines of this kind are constructed in works of great extent at St. Johnsbury, Vt., in New York, and various other places, and of all sizes, from those adapted for the use of families, grocers, and druggists, that may be placed upon a table, up to those of a capacity of 200 to 500 tons. The only other kind of what may strictly be called weighing machines is the spring balance. (See Balance.) Of this there are various forms, in which a spiral spring by coiling or uncoiling measures the force of gravity of the body weighed by means of a revolving index. When the spring is made of well tempered steel, the spring balance answers for most purposes where great accuracy is not required; but the balance with equal arms is the only one which can be used in weighing very small quantities. A hydrometer may be used to weigh solid bodies and estimate their specific gravities, as well as the specific gravities of liquids; but it is not considered in the ordinary sense as a weighing machine. (See Hydrometer.)

WEIGHTS AND MEASURES, means of determining by comparison, and expressing, in the former instance, the mass or quantity of matter of ponderable bodies, as shown by the effect of gravity upon them, and in the latter, the magnitudes of bodies, or of the various forms under which we regard and estimate space. The different species of quantity, of measure, and of unit may be classed as follows: 1, weights; 2, solidities or volumes (in body, or space); 3, surfaces; 4, angles; 5, lines; 6, times; 7, values (money, the artificial measure); 8, intensities or forces (expressed in weights or lengths). Quantity is always that which can be measured. But in order to find and express the measure of a quantity, we must first either find in nature or assume arbitrarily some fixed magnitude or value of the given kind, by comparison with which the relative amounts of the various examples of that kind of quantity are to be ascertained. This fixed magnitude or value is the unit of measure of the given kind of quantity, or in a given one among many systems of measuring it. Whether found in nature or arbitrarily chosen, the unit itself is always incapable of measurement, and is, *in se*, an unknown magnitude; so that all measures are comparative or relative only.—Since four right angles just fill the entire space about any point in a plane, and so correspond to the entire circumference of a circle, the right angle becomes a natural measure, or invariable natural unit; and the value of any definite part of this or of the circle is equally fixed. The early geometers accordingly divided the circle or its circumference into 360 equal parts, one of these parts, 1°, becoming the unit of circular or of angular measure; and this measurement is still retained. In estimating time, two natural units present themselves, the day and the year. (See Calendar, and Year.) For the subject of measures of value, see Coin, Money, and the articles on the various denominations of money. For measures of intensity of various natural agencies, see Electrometer, Light, Thermometer, &c. See also the titles of the ordinary measures. The forms of measure to be considered in this article are: weight; measures of length, giving linear or long measures; of surface or area, giving square or superficial measures; and of solidity or volume. Absolutely invariable standards of weight and measure have never yet been, and in the nature of the materials to be dealt with cannot be, attained; while to secure and reproduce measures of given sorts, the results of which shall be correct and uniform to within the least practicable degree of variability, is a problem upon which a vast amount of scientific research, ingenuity, and labor has been expended.—The balance, or scales, in a rude form, are known to have been in use from very early times. The Greeks, as appears from the Parian chronicle, believed weights, measures, and the stamping of gold and silver coins to have been alike the invention of Phidon, ruler of Argos, about the middle of the 8th century B. C. The units or counterpoises to be employed in weighing could easily be obtained by taking roughly equal bulks of some substance of nearly constant density, as iron or brass; but to render them more definite and accurate, it became necessary to call in the aid of more accurate measures of capacity; and a known volume of pure water and at known density is now the criterion universally resorted to for determining standards of weight. This supposes that the volume or cubic contents are correctly known; and as we can practically only express content or capacity in terms of the cube of a length, and area in terms of the square of a length, it follows that, to obtain exact units of measure of all the kinds here to be considered, it is necessary first to fix, and to be able to reproduce with the utmost possible exactness, the unit of length. The weight of bodies in the air is slightly diminished by the buoyancy of the medium, and that of all bodies upon the earth by the centrifugal tendency due to its rotation, as well as by increase of elevation above the sea level, as in ascending mountains; but since of these three disturbances the last two affect the article weighed and the counterpoise in the same degree, and the first also if their form and volume be the same, while the difference it can occasion in the result is extremely slight in any case, it follows that in weighing ordinary articles with scales or steelyards, the true weight is still shown under all conditions of the kinds named, or at the least to within an extremely small fraction. But weight determined by stretching or compressing a spring, as in the spring balance, will be strictly proportional to the force of gravity taking effect at the place, and hence will be lessened by the increased centrifugal force as we approach the equator, and by the diminishing attraction at heights considerably above the sea level.—In the history of weights and measures, three periods distinctly present themselves: the ancient, or that in which the classical standards were employed, ending with the decline of the Roman empire; the middle, during which, while the names of the classical measures were in many instances preserved, the standards were lost, and the various national measures of Europe grew up; and the modern period, beginning near the close of the 16th century, and marked by the attempts made toward correcting the variableness found in the measures of most nations, and to attain to exact standards through a knowledge and application of physical principles. Among the earlier measures of length of various nations are found such as the finger's length, the digit (second joint of the forefinger), the finger's breadth, the palm, the span, the cubit (length of forearm), the nail, the *orgyia* (stretch of the arms), the foot, pace, &c.; and the names of these measures, their almost constant recurrence among different nations, and the close approximation in length of such as have, like the foot, more nearly acquired the character of arbitrary measures, alike establish the fact that, in its origin, measurement of lengths was by the application of parts of the human body. In some parts of the East the Arabs, it is said, still measure the cubits of their cloth by the forearm, with the addition of the breadth of the other hand, which marks the end of the measure; and the width of the thumb was in like manner formerly added at the end of the yard by the English clothiers. Advantages of such measures for popular use are, that they are magnitudes known by observation and readily understood, and in an average way always capable of being recovered, when more arbitrary standards might be wholly lost. But their great disadvantage is extreme variableness, especially when directly applied; and in the gradual progress of men's minds toward exactness of conception and reasoning, though the precise period of the first of these may not now be known, three successive plans of insuring greater accuracy have presented themselves, and two at least have secured permanent adoption. The first is that of obtaining a uniform standard by exchanging the measures by parts of the body for conventional or arbitrary lengths which should represent their average, and which were to be established by law; and this point was doubtless reached at the same time among the Greeks and Romans. In England, arbitrary standards appear to have been known and in common use at an early date. The names "grain" occurring in troy weight, and "barleycorn" in long measure, show what were in that country the originals or natural units resorted to in forming these measures; or at the least, what were the natural objects chosen as the means of fixing the value of such measures. A statute of Henry III. (1266) enacts "that an English penny, called the sterling, round, without clipping, shall weigh 32 grains of wheat, well dried and gathered out of the middle of the ear; and 20 pence [pennyweights] to make an ounce, 12 ounces a pound, 8 pounds a gallon of wine, and 8 gallons of wine a bushel of London, which is the 8th part of a quarter." Again, Edward II. (1324) provides that the length of 3 barleycorns, round and dry, shall make an inch, 12 inches a foot, &c. The difficulty of determining how much of the end of the grain should be removed to render it "round" makes this standard the less definite of the two. No record exists, however, of the actual construction of standard units based upon the above definitions in grains and barleycorns. In comparisons of the recorded results of measurements in different countries of Europe, and at different periods, much confusion has existed and has been well nigh unavoidable, growing out of gradual or repeated changes in the standards in current use. As would be expected, the modern legal or conventional standards, as reproduced and in actual use, were found after a time to be subject to considerable variation. For example, from 1650 to 1688 there were in England three different measures of the wine gallon: 1, the more general opinion and usage gave 231 cubic inches to the gallon; which, it should be noted, is the capacity of a cylinder of 6 in. height and 7 in. diameter, taking the circumference at 22 in.; 2, the customary standard at Guildhall, supposed to be of such capacity, was later found on measurement to contain only 224 cubic inches; 3, the real and legal standard, preserved at the treasury, contained 282 cubic inches. The corn gallon differed from any of these, being 268·6 cubic inches. Some suppose the gallons of 231 and 282 inches to have originated under separate enactments, the latter from one of Henry VII., directing that the gallon contain 8 lbs. of wheat; but Oughtred holds that the larger or beer gallon was allowed for liquids which yield froth, while the less gallon was that appropriated to the liquids, such as wine and oil, which, as not frothing, show at once their true volume. Variations of this sort in measures must have existed without intention, and increased; and hence the second step toward exactitude of measurements became necessary, namely, that of making accurate comparisons of the various standards of each given sort in a country. Attempts of this kind appear in England to have been commenced under the auspices of the royal society in 1736 and 1742; in the former year, by a comparison of the English, French, and old Roman standards; and in the latter, by the determination, by George Graham, of the length of a pendulum beating seconds at London (at 39·13 in.), and the construction of a standard yard. Of this, under direction of the house of commons, Mr. Bird prepared two accurate copies, respectively marked "Standard yard, 1758" and "1760," and intended for adoption as the legal standards. He determined and prepared also the pound troy, the original of that now in use. Of these two standards no intentional alteration has since been made; so that these and their derivatives are now in use in England and the United States. The third proposed step in the way of rendering measures exact, has reference rather to the means of making the standards recoverable in case they should be lost. In the definite pursuit of this purpose, the French philosophers of the time of the revolution took the lead, and devised the metric system, in which the unit of length is derived from the dimensions of the earth, and the units of capacity and weight are made dependent upon the former, while the whole has decimal multiples and subdivisions. As this system has since gone into very extended use, a full account of it will be given after completing the history of the English and American standards. The efforts of the French philosophers called attention in England to the desirableness of having the standards commensurable with a natural unit; and for this purpose the length of the seconds pendulum at London was selected. Reports made in 1816, 1818, and 1820, to the house of commons, based on experiments and comparisons, in which Wollaston, Dr. Young, Capt. Kater, and Prof. Playfair took a prominent part, led to the adoption of the imperial measures and standards, under the act 5 George IV., which took effect Jan. 1, 1826, and which the law of 5 and 6 William IV., taking effect Jan. 1, 1836, did not modify in respect to the standards adopted. The weights and measures which had been in vogue in England previous to these acts, based on Bird's standards, 1758 and 1760, had meanwhile become established in the United States, so that here the standards of the old English system are still in force. In the imperial measures, the yard copied from the standard of 1760 was to be of brass, and measured at the temperature of 62° F., while its length was further defined by declaring that of the pendulum beating seconds of mean time in the latitude of London, at the above temperature, in a vacuum, and at the level of the sea, to be 39·1393 inches of the above standard. The pound troy, from the standard of 1758, is also defined by determining that the cubic inch of distilled water weighed in air by brass weights, at 62°, the barometer being at 30 inches, is equal to 252·458 grains (the pound being 5,760 grains). The standard for measures of capacity, whether dry or liquid, was declared to be the gallon, to contain 10 lbs. avoirdupois weight (this pound being 7,000 grains troy) of distilled water, weighed in air, at 62° F., the barometer showing 30 inches—this to be thenceforward the measure for all liquids; and the bushel was determined by the requirement that it should contain 8 such gallons. These standards only became compulsory as the sole legal measures after Jan. 1, 1836. The gallon in this system contains 277·274 cubic inches. The former wine gallon is hence 0·83311 of the imperial, or very nearly 6 of the former to 5 of the latter; while the old or Winchester bushel (so called because its standard was long preserved at Winchester) was 0·969447 of the imperial bushel, or about 33 of the former to 32 of the latter. Soon after the standards were prepared they were destroyed by the burning of the houses of parliament (1834); but fortunately the astronomical society had procured a most carefully prepared copy of the imperial standard yard, and the mint was in possession of an exact copy of the pound, so that it was possible to reproduce the lost standards with great precision. The commission appointed in 1838 to restore them, of which Airy, Baily, Herschel, Lubbock, and Sheepshanks were members, after much investigation, reported in 1841 that, since the passage of the act 5 George IV., several elements of reduction of the pendulum experiments, on which some of its provisions were based, had been found to be doubtful or erroneous, there having been defects in the agate planes of the pendulum used by Capt. Kater, and errors in finding its specific gravity, and in reductions for buoyancy of the air and for elevation above the sea level. They concluded that the course prescribed in the act would not necessarily reproduce the original yard; that the other definition in the act of the yard as a certain brass rod was the best that could be adopted; and that by aid of the astronomical society's scale, and a few other highly accurate copies known, the standard could be restored without sensible error. Mr. Baily was selected to prepare the new standard, having five copies of the preceding on which to base his comparison; and on his death in 1844 Mr. Sheepshanks continued the necessary observations, the latter alone executing in all, in the course of this labor, about 200,000 micrometric measurements. Of several standard copies finally prepared by him, each being a square inch bar, of a bronze consisting of copper with a small percentage of tin and zinc, 38 in. in length, with half-inch wells sunk to the middle of the bar, one inch from each end, in which the lines defining the yard are drawn on gold plugs, six were finally selected and reported by the commissioners in March, 1854; of these, the one marked "Bronze, 19" was selected as the parliamentary standard yard, the remaining five being deposited, along with copies of the standard of weight, with as many public institutions and scientific bodies. These standards were legalized in July, 1855; and in case of loss of the parliamentary copy, it was provided that the standards should be restored by comparison of the other selected copies, or such as might be available. Thus, the latest verdict of science may be regarded as adverse to the practicability of basing a system of weights and measures on any invariable natural unit of dimension. Bronze bar No. 11, which has the standard length at a temperature of 61·79°, has been presented to the United States, and is the actual standard of comparison.—The weights and measures used by the various colonies planted in America were from the first the same with those of England at the corresponding period. Considerable variations naturally grew up in the different colonies, and the several weights and measures already in use being adopted with little or no change when these became states, the discrepancies continued to exist. By a resolution of the senate, March 3, 1817, John Quincy Adams was commissioned to examine the subject of the weights and measures of the United States, including (it appears) the question of the desirableness of the adoption of the French system or some similar one. Mr. Adams had the standards employed in the various custom houses of the country examined and carefully measured during the years 1819–'20; and in a table accompanying his report, published in Washington in 1821, he shows that very considerable discrepancies then existed within the limits of the several states, and often within the same state, in all the measures of weight, dimension, and capacity. He reviewed the French system at length, and reported unfavorably to its adoption, chiefly on the grounds of the popular repugnance to a new system, of the subversion of uniformity that for a time would result, and the inconvenience, in his view, of a decimal system. By an act of congress, May 19, 1828, the brass troy pound procured by the American minister at London in 1827, which was a copy prepared by Capt. Kater of the English standard, was declared the standard troy pound of the mint of the United States, conformably to which its coinage should be regulated. The senate, May 29, 1830, directed a new comparison of the weights and measures in use at the different custom houses. This was intrusted to Prof. Hassler; and though much discrepancy was found, the mean corresponded closely with the English standards verified in 1776. Under Mr. Hassler's supervision, accurate copies of the received standards of weights and measures were supplied to all the custom houses. Meanwhile, by a joint resolution of congress, June 14, 1836, the secretary of the treasury was directed to cause a complete set of all the weights and measures adopted as standards to be delivered to the governor of each state in the Union for the use of the states respectively. These, as well as accurate balances for adjusting the weights, have been supplied, and the statutory standards of every state have been made conformable to the standards so furnished. It is to be observed that congress has never made any enactment in reference to the old English standards which have come down to us, since the latter were necessarily in force as the national standards unless changed by legislative enactment. The only exception is the legalization of the troy pound, used in the mint, which is identical with the corresponding British troy pound. The other standards of the United States are the yard of 36 inches and the avoirdupois pound of 7,000 grains, both identical with the corresponding British imperial standards; the gallon, intended to represent the old wine gallon of 231 cubic inches, but defined as containing 58,372·2 grains of distilled water at its maximum density, weighed in air of the temperature of 62° F., and barometric pressure of 30 in.; and the bushel, containing 77·6274 pounds of water under the same conditions, equivalent to the old Winchester bushel of 2,150·42 cubic inches. Before the completion of the new imperial standard, the American yard was taken from a scale made for the United States by Troughton, which was supposed to be identical with the old standard and with the astronomical society's scale, but which had never been directly compared with either. On comparison with the bronze standard No. 11, the yard on the Troughton scale was found to be nearly $\frac{1}{1000}$ of an inch too long, and hence all the copies furnished to the states are subject to that minute correction, since the British yard is unquestionably the only authentic representative of the old standard from which our measures are derived. The use of the metric standards has been legalized, but not made obligatory, in Great Britain since 1864, and in the United States since 1866.—*Metric Standards.* In France, as before mentioned, a radical change was made in the existing standards by the adoption in 1795 of a system according to which the $\frac{1}{10,000,000}$ part of a meridional quadrant of the earth should be the unit of length measure, called the *mètre;* the unit of surface measure being the square of ten metres, called the *are;* the unit of capacity measure, the cube of a tenth part of the metre, called the *litre;* that of the measure of solidity, having the capacity of a cubic metre, called the *stère;* and the unit of weight being the weight of that quantity of distilled water at its maximum density which fills the cube of the $\frac{1}{100}$ part of a metre, called the *gramme.* Each unit has its decimal multiples and subdivisions, which are indicated by prefixes placed before the names of the several fundamental units. The prefixes denoting multiples, derived from the Greek, are *déca*, ten; *hecto*, hundred; *kilo*, thousand; and *myria*, ten thousand. Those denoting subdivisions are taken from the Latin, and are *déci*, tenth; *centi*, hundredth; and *milli*, thousandth. We thus have *kilomètre*, *mètre*, *millimètre; kilogramme*, *gramme*, *milligramme.* A complete list of the metric measures and their equivalents in American units will be found below in the general table of weights and measures of all countries, under the head of France. An arc of the meridian extending from Dunkirk to Barcelona, and comprising about 10° of latitude, was measured trigonometrically, in order to deduce from it, with the aid of other arcs previously measured in Peru and in Sweden, the length of the meridional quadrant passing through Paris. This length was found in terms of the *toise* or old fathom (six-foot) measure of France, which was used in the measurement of the base lines; and its ten-millionth part, or the length of the *mètre*, was determined to be 443·296 lines, the line being the $\frac{1}{144}$ of a foot. It appearing thus that four metres would exceed two toises by the 19th part of a toise, very nearly, the following process of constructing the metre was adopted: Nineteen pieces were made, as nearly as possible equal to each other, so that their aggregate would be a toise; upon careful comparison it was found that one had almost exactly the required length. This piece, together with the two toises that had served in the base measurements, was placed in the comparator and compared with four single metre bars abutted together, which were similarly compared with each other, and adjusted by grinding and polishing their ends until they had the desired length. These bars were, like the toises, of iron; one of them was chosen for the French standard, from which the platinum metre of the archives, which is the legal standard of France, was copied. Another of these original metres was brought to the United States, and has served as the standard for the geodesy of the coast survey, and for the construction of a metric standard for this country. The kilogramme was constructed by means of a cylinder of one fourth of a metre diameter and equal height, very carefully admeasured; it was hollow, and just heavy enough to sink freely in water. The volume of water displaced by it being weighed by means of an approximate kilogramme and fractions, the correction required to reduce the experimental weight to the prescribed value of the weight of a cubic decimetre of water at its maximum density was deduced, making due allowances for the buoyancy of the air and all other requisite corrections. Finally a kilogramme of platinum was deposited in the archives of France as the prototype unit of weight. It has been found to be equal to 15,432·348 grains, or 2·2046212 pounds avoirdupois, by the most careful comparisons. The metre was found to be 39·37079 English inches, but the most recent and elaborate comparisons, made at the ordnance survey office in Southampton, indicate that it is only 39·37043 inches. The difficulty in making an exact comparison between the metre and the inch or the yard, arises from the fact that the metre is an end measure, of platinum, having its standard length at 32° F., while the yard is a line measure, of bronze, standard at 62° F. They cannot therefore be directly compared, and the dilatation by temperature comes into effect, and requires to be ascertained with the utmost accuracy. The means of comparison for standards of length are different, according to their being line or end measures. In the former case, when, as in the British yard, the standard length is contained between lines drawn upon the bar, the comparator is necessarily optical, which enables us to measure by means of micrometer microscopes the minute differences between different measures traced from the same standard by mechanical means. But when the standards are end measures, or contained between the terminal planes of the bar, the comparison is necessarily made by actual contact, the rotation of a mirror or tilting of a delicate level being used as the means of indicating the minute differences. In standard measures of the latter kind, it is now customary to make the terminal surfaces very small and ground off parallel to each other by means of cylindrical bearings near each end of the bar. It is only by such means that parallelism approaching to geometrical accuracy can be obtained. In both kinds of comparison, a precision of the $\frac{1}{100,000}$ part of an inch may be reached. The greatest difficulty in obtaining extreme precision arises from the variability of temperature; and this is greatly enhanced when the measures compared are of different volume, and still more when of different metals. In comparisons of precision, it is therefore necessary to insure a great uniformity of temperature, to prevent as much as possible the influence of the bodily heat of the observer upon the apparatus. In comparisons of weights, the accuracy attainable with the best balances at present in use is readily to the $\frac{1}{1,000,000}$ part, and by repetition, under favorable conditions, may be pushed considerably further, to the $\frac{1}{1000}$ of a grain in a pound, or at the utmost to $\frac{1}{10}$ of a milligramme in a kilogramme. But for such precision it is necessary that the weighing be done in a vacuum, since minute errors will arise from movements of the air within the case of the balances, apart from the corrections due to the buoyancy of the air, which will affect differently weights of different volume. Even in France it was not found practicable at once to introduce the metric units into common use; and although they were at first made compulsory, it became necessary to relax the law so as to permit the use of halves and quarters of the several units. Since 1840, however, the metric measures have been the only ones in common use in France; and the system has found a very large acceptance among other nations. This fact is chiefly due to the necessity existing in many countries of making some change for the unification of standards used in their various provinces, in order to remedy the evil of varying local standards, and to the additional advantage of international uniformity presented by the adoption of the metric system. For many years its use was limited to the nations of Latin origin cognate to the French, but the recent adoption of the metric system throughout the German empire has determined its prevalence on the European continent.—The only standard which may contend with the metre for universal adoption is the English inch, which is the common unit of length in the British empire, Russia, and the United States. Sir John Herschel has pointed out that the polar axis of the earth is almost exactly 500,500,000 inches, and that the inch may therefore be considered quite as properly a natural standard as the metre; and that the desirable correlation between volume and weight may be found in the fact that a cubic foot of distilled water weighs very nearly 1,000 ounces. By slight changes of the units this relation might be made exact, and the inch become equal to the $\frac{1}{500,000,000}$ part of the earth's polar axis, 25 of such inches making a cubit, equal to the $\frac{1}{10,000,000}$ part of the polar radius.—With a view to the construction of more perfect and uniform copies of the metre and kilogrammes, and their distribution to different countries, an international standard commission, composed of scientific representatives from all civilized nations, was formed in 1869, meeting at Paris, and its work is now (1876) nearly completed. This movement has resulted in the establishment of a permanent international bureau of weights and measures, maintained at the common charge of the contracting powers, and having for its object the preservation of the international standards and their test copies; the maintenance of the apparatus for comparison; the periodic verification of the metres and other standards of different nations; the comparison of geodetic measuring bars, and scales used for scientific work; and in general the maintenance of extreme precision and permanence in the fundamental units of measure. The new prototypes conform as exactly as possible to those heretofore recognized as standards, and no attempt has been made to make them conform more nearly to their theoretical definitions. In regard to the metre, it has been found as the result of more extended geodetic measurements, up to 1875, that the meridional quadrant exceeds 10,000,000 metres by about 1,850 metres, and that consequently the metre falls short of its definition by its $\frac{1}{5400}$ part. The kilogramme is in like manner found to differ from its presumed value by some small fraction, in consequence of the great difficulty attending exact determinations of that kind. But it is now generally admitted that material standards, of which there are many exact copies, are all-sufficient for the preservation of the adopted units. The new standards are made of an alloy of platinum and iridium, which possesses the most desirable mechanical and chemical properties, insuring their remaining unchanged for all time.—See Panctou's *Métrologie* (Paris, 1780); Bessel on the Prussian unit of length (Berlin, 1839); the report of J. Q. Adams (Washington, 1821); Hassler's "Report on the Construction of Standards for the United States" (H. R. Doc. 299, 1832); the "Account of the Construction of the New National Standard of Length, and of its Principal Copies," in the "Philosophical Transactions" (vol. clxvii., London, 1857); account of the restoration of the standard of weight, in the "Philosophical Transactions" (1856); Bache's "Report on Standard Weights and Measures" (Sen. Ex. Doc. 27, 1857); J. H. Alexander, "Universal Dictionary of Weights and Measures" (Baltimore, 1850); Woolhouse, "Measures, Weights, and Moneys of all Nations" (Weale's series, London, 1856); F. W. Clarke, "Weights, Measures, and Money of all Nations" (New York, 1875); Charles Davies, "The Metric System, &c." (New York, 1871); F. A. P. Barnard, "The Metric System" (New York, 1871); and reports of the warden of the standards (London), of which the 7th, 8th, and 9th (1872–'5) are very interesting and valuable. See also "Comparisons of Standards of Length made at the Ordnance Office, Southampton," by Capt. A. R. Clarke (1866), and "Report of the British Standards Commission on the Metric System" (1869).—The following is a summary of weights and measures in use among the principal nations of the globe, with their equivalents in the standards of the United States:

Arabia (Mocha).—Length: the guz = 25 in., the covid = 19 in., the kassaba = 4·1 yards. Liquids: 128 vakias = 8 nusfias = 1 gudda = 2 gallons. Weights: 40 vakias = 1 maund = 3 lbs. avoirdupois; and 150 maunds = 15 frazils = 1 bahar = 450 lbs. The weights of Egypt are used in some parts.

Argentine Republic.—(See *Spain.*) Metric system legal and used in customs.

Austria.—Length: 1,728 punkte = 144 linien = 12 zoll = 1 fuss = 1·0371 ft.; 6 fuss = 1 klafter; and 4,000 klafter = 1 meile = 4·7142 m. Surface: 1,600 square klafter = 1 joch = 1·4223 acre. Liquid: 80 kannen = 40 maasse = 4 viertel = 1 eimer = 14·95 galls.; and 32 eimer = 1 fuder. Dry: 16 mühlmaassel = 8 achtel = 4 viertel = 1 metze = 1·745 bush.; and 30 metzen = 1 muth. Weight: 1 loth = 270·2 grs.; and 32 loth = 16 unzen = 4 vierding = 2 mark = 1 pfund = 1·2352 lb. The measures differ in some parts; the French measures, under different names, were made legal in 1876.

Baden.—The fuss is 0·9842 ft.; the stütze, 3·963 galls.; the malter, 4·257 bush. = 15 décalitres; the pfund, 1·1029 lb. avoirdupois. Metric system since 1872.

Bavaria.—The fuss is 0·9517 ft.; the eimer, 16·944 galls.; the scheffel, 6·31 bush.; the pfund, 1·2346 lb. Metric system since 1872.

Belgium.—Since 1820, the French weights and measures, but retaining mainly the Dutch names; as, aune or elle for mètre; litron or kan for litre; livre or pond for kilogramme. In weight, the denominations, ascending by tens, are the korrel, wigtje, lood, ons, and the pond = 2·20486 lbs. Surface: 100 sq. elles = 1 are = 119·6033 sq. yds. The cubic elle = 1 stère = 1·308 cub. yd.

Bohemia.—The Prague foot = 11·88 in. The measures are generally those of Austria.

Brazil.—In general, those of Portugal. But of Brazil pounds, 99 = 100 lbs. avoird.; 5 varas = 6 yds. The medida = ⅗ gall.; the alqueire = 1·135 bush.; the mark = 7·3781 oz. troy. Metric system now legal.

Bremen.—The fuss is 11·386 in.; the morgen, 0·6343 acre; the viertel, 1·915 gall.; the scheffel, 2·102 bush.; the pfund = 2 mark = 16 unzen = 32 loth = 1·0986 lb. avoird. (See *Germany.*)

Canada and other British Possessions in North America.—The weights and measures are those of Great Britain. Metric system legal, but not obligatory.

Cape of Good Hope.—The Dutch standards were formerly in use, but are now mainly superseded by the English.

Chili.—In general, those of Spain. Metric system legal.

China.—Length: 100 fans = 10 tsuns = 1 chik or covid = 13·125 in.; and 100 chiks = 10 cheungs or fathoms = 1 yan = 109·4 ft. Liquid: 100 kops = 10 shings = 12 catties = 1 tau = 1·318 gall.; and 10 taus = 1 hwuh = 13·18 galls. Weight: 16 taels = 1 catty or pound = 1⅓ lb. avoird.; 100 catties = 1 pecul or tam = 133⅓ lbs.

Cuba.—Generally, those of Spain. In trade are also used 100 libras = 4 arrobas = 1 quintal = 101·75 lbs. avoird.; the vara = 33·333 in.; the fanega = 2·9 bush.; the arroba for wine, 3·42 galls.

Denmark.—Length: 144 linies = 12 tommes = 1 fod = 1·0298 ft.; and 24,000 fods = 12,000 alens = 1 miil = 4·68 m. Liquid: 8 potts = 4 kandes = 2·041 galls. Dry: 36 potts = 2 skjeppens = 1 fjerding = 0·990 bush.; and 88 fjerdings = 22 töndes = 1 last = 86·84 bush. Weight: 32 orts = 1 unze = 1·1029 oz. avoird.; and 16 unzes = 2 marks = 1 pund = 1·1029 lb.; 16 punds = 1 lispund; 20 lispunds = 1 skippund = 352·9 lbs.

East Indies (Bengal, Calcutta).—Length: 36 jows = 12 ungleez = 3 moots or hands = 1 span = 9 in.; and 8 spans = 4 cubits = 2 guz or yards = 1 fathom; 1,000 fathoms = 1 coss = $1\frac{3}{22}$ m. Weight (bazaar): 80 siccas = 16 chittacks = 1 seer = 2·0533 lbs.; and 40 seers = 1 maund. In Madras, the marcal is 3·25 galls.; the vis, 3,125 lbs. In Bombay, the hath is 18 in.; the parah, 3·83 bush; the seer, 0·7 lb. Many other variations, of course, exist in the different districts and islands. The metric system is now legalized, but the kilogramme is called ser. Special weights and measures may be authorized by the governor general, but must be a multiple or submultiple of the above.

Egypt.—The common cubit = 22·667 in.; that for Indian goods, 25 in.; for European cloths, 26·5 in. Dry: 24 rubahs = 6 weybehs = 1 ardeb = 5·00 bush. Weight: 144 dirrhems = 12 ukkiyehs = 1 lb. or rutl = 15·75 oz. avoird.; and 100 rutls = 1 cantar. The weights and measures vary, however, in different parts.

France.—Length: 1,000 millimètres = 100 centimètres = 10 décimètres = 1 mètre = 39·37079 in.; and 10,000 mètres = 1,000 décamètres = 100 hectomètres = 10 kilomètres = 1 myriamètre = 6·21382 m. Surface: 100 centiares = 1 are, *i. e.*, 1 square décamètre = 0·0247 acre; and 100 ares = 10 décares = 1 hectare. Liquid: 1,000 millilitres = 100 centilitres = 10 décilitres = 1 litre, *i. e.*, 1 cubic décimètre = 61·02705 cub. in. = 2·1134 pints; and 10,000 litres = 1,000 décalitres = 100 hectolitres = 10 kilolitres = 1 myrialitre = 2,641·8 galls. Solid: 10 décistères = 1 stère, *i. e.*, 1 cubic mètre = 35·3166 cub. ft.; and 10 stères = 1 décastère. Weight: 1,000 milligrammes = 100 centigrammes = 10 décigrammes = 1 gramme = 15·43 grs. troy; and 10,000 grammes = 1,000 décagrammes = 100 hectogrammes = 10 kilogrammes = 1 myriagramme = 22·046 lbs. avoird. In the old system, of length: 144 lignes = 12 pouces = 1 "pied de roi" = 12·79 in.; and 12,000 pieds = 2,000 toises = 1 "lieue de poste." Weight: 72 grains = 1 gros; and 128 gros = 16 onces = 2 marcs = 1 poids de marc = 1·3116 lb. troy.

Frankfort-on-the-Main.—The fuss is 11·27 in.; the viertel, 1·895 gall.; the malter or achtel = 4 simmer = 3·256 bush.; the pfund = 1·0314 lb. avoird. (See *Germany.*)

Genoa.—The palmo is 0·8173 ft., the piede manuale 1·226 ft., the piede liprando 1·6857 ft., the braccio 1,907 ft.; the barile = 50 pinte = 19·605 galls.; the quarto = 12 gombette = 0·427 bush.; the rottolo = 18 once = 1·0483 lb. avoird. (See *Italy.*)

Germany.—The great diversity of weights and measures which has heretofore obtained in the different states has recently been done away with by the obligatory use of the metric standards throughout the empire. The old measures are noticed under the heads of the different states. In the use of the metric system there has been some adaptation of names to the language. Units of length: the meter or stab, zentimeter or new zoll, millimeter or strich. Surface: ar and hektar. Capacity: liter or kanne, hectoliter or fass; 50 liters make 1 scheffel; ½ liter is called schoppen. Weight: kilogram = 2 pfund; 50 kilograms = 1 zentner; 1,000 kilograms = 1 tonne. The values of the metric units are precisely the same as in France.

Great Britain.—For the value of the several units of weight and measure, see the preceding general statement. The denominations and values in the measures of length, surface, and solidity are the same as those of the United States. The same is true of the various systems of weight. The stone is 14 lbs. The units of liquid and of dry measure at present differ from those of the United States, as previously explained, being those known as the imperial: 1 imp. gallon = 1·2006 U. S. gall.; 1 imp. bushel = 1·0315 U. S. bush. In customary use measures of the same name differ. Thus, in wine measure: 32 gills = 8 pints = 4 quarts = 1 gallon; 36 gallons = 1 tierce; 1½ tierce = 1 hogshead; 2 hogsheads = 1 pipe, butt, or puncheon. Beer measure: 32 gills = 8 pints = 4 quarts = 1 gallon; and 36 gallons = 4 firkins = 2 kilderkins = 1 barrel; 3 kilderkins (54 gallons) = 1 hogshead; 4 hogsheads = 2 butts = 1 tun. Dry (the gallon the same as for liquids): 32 gills = 8 pints = 4 quarts = 1 gallon; 8 gallons = 4 pecks = 1 bushel; and 80 bushels = 20 coombs = 10 quarters = 2 weys = 1 last. The pottle is ½ gallon; the strike, 2 bushels. The hogshead, pipe, and puncheon (liquid measure) differ also in the case of different wines or other spirituous liquors intended. The old Scottish and Irish measures differed from the English, and were also variable with locality.

Greece.—The French metrical system is in use. Of old measures of length, the short and long picha are 25 and 27 in., the cubit 18 in., the stadium 600 ft.; the kila is 0·9152 bush.; the pound, 0·8811 lb. avoird.

Hamburg.—Length: 96 achtel = 12 zoll = 1 fuss = 0·9408 ft.; and 2 fuss = 1 elle; the meile = 4·6807 m. The morgen = 2·3852 acres. Liquid: 16 össel = 8 quartier = 4 kannen = 2 stübchen = 1 viertel = 1·9074 gall.; and 120 viertel = 24 anker = 6 ohm = 1 fuder; the eimer is 4 viertel. Dry: 8 spinte = 2 himt = 1 fass = 1·4941 bush.; and 60 fass = 30 scheffel = 3 wispel = 1 last. Weight: 32 pfennige = 8 quentchen = 2 loth = 1 unze = 1·068 oz. avoird.; and 16 unzen = 2 mark = 1 pfund = 1·068 lb. (See *Germany.*)

Hanover.—Length: 144 linien or 96 achtel = 12 zoll = 1 fuss = 0·9542 ft.; and 16 fuss = 8 ellen = 1 ruthe; 25,400 fuss = 1 meile = 4·5901 m. Liquid: the denominations have the same scale and names as in Hamburg, except that the össel is called nössel, the viertel being 2·072 galls.; the eimer is 16·576 galls. Dry: 24 vierfass or 18 drittel = 6 himt = 1 malter = 5·3056 bush; and 16 malter = 2 wispel = 1 last. Weight: scale and names as in Hamburg, except the use of örtchen for spinte, the pfund being 1·0731 lb. avoird. (See *Germany.*)

Italy.—The metric system is now legal throughout the kingdom. For the former local weights and measures see names of states.

Japan.—Length: the unit is the shaku = 11·948 in.; 1 shaku = 10 sun = 100 boo; 6 shaku = 1 ken; 60 ken = 1 cho; 39 cho = 1 ri = 2·444 m. Surface: 6 shaku square = 1 tsubo; 300 tsubo = 10 se = 1 tau; 10 tau = 1 cho = 2·458 acres. Capacity, dry and liquid: 100 sho = 10 to = 1 koku = 5·169 bush.; 10 go = 1 sho = 0·481 gall. Weight: 1 momme = 57·97 grains; 1,000 momme = 1 kuamme; 160 momme = 1 kin, also called catty, = 1·325 lb. avoird.

Lübeck.—The fuss is 0·9542 ft.; the viertel, 1·979 gall.; the scheffel, 1·01 bush.; the pfund, 1·0686 lb. avoird. (See *Germany.*)

Mecklenburg.—The weights and measures are the same, throughout this state, as those of Hamburg, except that the measures of capacity are those of Lübeck. (See *Germany.*)

Mexico.—The weights and measures are those of Spain, but with many local variations. The vara is 82·97 in.; the fanega, 1·55 bush.; the libra, 1·0142 lb. avoird.

Morocco.—The cubit or canna is 21 in.; the pic, 26 in.; the commercial pound is 1·19 lb., and the market pound 1·785 lb. avoird.

Naples.—The palmo is 0·8652 ft., and the miglio 1·147 m.; the moggio, 0·87 acre; the barile (wine, &c.), 11·57 galls., and the stajo (oil), 2·616 galls.; the tomolo, 1·450 bush.; the libbra, 0·8594 lb. troy. (See *Italy.*)

Netherlands.—The French metrical system has been in use since 1817, but with the Dutch names. Length: the denominations from the millimètre to the kilomètre inclusive take the names streep, duim, palm, elle, roede, mijle; the elle = 1 mètre. Liquid: from the centilitre to the hectolitre inclusive, the names are vingerhoed, maatje, kan, vat; the kan = 1 litre. Dry: from the décilitre to the hectolitre the names are maatje, kop, schepel, mudde or zak; the kop = 1 litre; 30 mudde = 1 last. Weight: from the décigramme to the kilogramme the names are korrel, wigtje, lood, ons, pond; the wigtje = 1 gramme.

Norway.—(See *Sweden.*) Metric standards now legal.

Persia.—The royal guertze is 37½ in., the common, 25 in.; the artaba, 1·851 bush.; the rattel, 1·0568 lb. avoird.

Poland.—The lokiec is 22·68 in.; the morg, 1·334 acre; the garniec, 1·057 gall.; the funt, 0·894 lb. avoird.

Portugal.—Length: 12 pontos = 1 linha; 96 linhas = 8 pollegadas = 1 palmo or span = 0·7214 ft.; and 10 palmos = 2 varas = 1 braça or fathom; the milha = 1·2786 m. The geira is 1·4453 acre. Liquid: 24 quartilhos = 6 canadas = 1 pote, cantaro, or alqueire = at Lisbon 2·185 galls., at Oporto 3·313 galls.; and 2 potes = 1 almude. Dry: 32 outavas = 4 alquieres = 1 fanga = at Lisbon 1·535, and at Oporto 1·937 bush.; and 15 fangas = 1 moio. Weight: 72 grãos = 3 scropulos = 1 outava; 128 outavas = 16 onças = 1 arratel = 1·01186 lb. avoird.; and 128 arrateles = 4 arrobas = 1 quintal = 129·518 lbs. avoird.

Prussia.—Length: 1·728 scrupel = 144 linien = 12 zoll = 1 fuss = 1·0298 ft.; and 12 fuss = 1 ruthe; 2,000 ruthen = 1 postmeile. The morgen is 0·631 acre. Liquid: 120 össel = 60 quartier = 2 anker = 1 eimer = 18·146 galls.; and 12 eimer = 6 ohm = 1 fuder. Dry: 64 mässchen = 16 metzen = 4 viertel = 1 scheffel = 1·560 bush.; and 72 scheffel = 6 malter = 1 last. Weight: 128 quentchen = 32 loth = 16 unzen = 2 mark (Cologne) = 1 pfund = 1·0311 lb. avoird. Metric system now legal and obligatory. (See *Germany.*)

Rome.—Length (commercial): the piè is 0·966 ft.; the palmo, 0·733 ft.; the braccio, 2·561 ft.; the palmo for cloth is 8·347 in. Length (in architecture, &c.): 120 decimi = 12 once = 1 palmo = 0·7325 ft.; and 10 palmi = 1 canna, the catena being 57½ palmi; and the piè = 16 once = 0·9767 ft. Liquid: 16 quartucci = 4 fogliette = 1 boccale = 0·4816 gall.; 32 boccali = 1 barile, and 16 barili = 1 botte. Dry: 4¾ quartucci = 1⅜ scorzi = 1 starello = 0·5222 bush.; and 16 starelli = 4 quarte = 1 rubbio. Weight: 24 grani = 1 denaro; 24 denari = 1 oncia; 12 once = 1 libbra = 0·7477 lb. (See *Italy.*)

Russia.—Length: 16 vershoks = 1 arshin = 28 in.; and 1·500 arshin = 500 sazhens = 1 verst (properly versta) = 0·6629 m. Liquid: 100 tcharkas = 1 vedro = 3·249 galls.; 3 vedros = 1 anker (ankerok), and 40 vedros = 1 sorokovaya. Dry: 16 garnets = 8 tchetverkas = 2 tchetveriks = 1 payak = 1·489 bush.; and 4 payaks = 2 osmins = 1 tchetvert. Weight: 96 doli = 1 zolotnik = 0·1504 oz. avoird.; 12 lanas (each 8 zolotniks), or 32 loths (each 3 zolotniks) = 1 funt = 0·9026 lb. avoird.; and 1,200 funts = 30 poods = 10 berkovetz = 1 packen.

Saxony.—The fuss is 0·929 ft.; the kanne is 1·2723, and the eimer 20·039 galls.; the viertel is 0·737, and the scheffel 2·948 bush.; the pfund = 16 unzen = 1·0309 lb. avoird. (See *Germany.*)

Siam.—The ken is 3·153 ft.; the sesti, ⅓ bush.; the tael 0·129, and the catty 2·583 lbs. avoird.

Sicily.—The palmo is 9·53 in.; the salma (Messina), 23·07 galls.; the grossa, 9·90 bush.; the libbra, 0·7 lb.; and the rottolo, heavy and light, 1·925 and 1·75 lb. avoird. (See *Italy.*)

Spain.—The metric system is now the legal one. The old weights and measures, as used in Madrid and Castile, are: Length: 144 puntos = 12 lineas = 1 pulgada = 0·927 in.; 12 pulgadas = 2 sesmas = 1 pié = 0·9273 ft.; and 12 piés = 4 varas = 1 estadal; the palmo is 8·346 in.; the legua = 8,000 varas = 4·2152 m. Liquid: 128 copas = 32 cuartillos = 8 azumbres = 1 arroba or cantaro = 4·263 galls. for wine; for oil, 1 arroba = 3·318 galls. Dry: 16 ochavillos = 4 raciones = 1 cuartillo; and 48 cuartillos = 24 medios = 12 almudes = 1 fanega = 1·60 bush.; and 12 fanegas = 1 cahiz = 19·20 bush. Weight: 12 granos = 1 tomin; 48 tomines = 16 adarmes = 8 ochavas = 1 onza = 0·0634 lb.; and 16 onzas = 2 marcos = 1 libra = 1·0144 lb. avoird.

Sweden and Norway.—Length: 144 linies = 12 tums = 1 fot = 0·9742 ft.; and 6 fots = 3 alns = 1 famn; 6,000 famns = 1 mil = 6·6423 m. Liquid: 32 jungfrus = 8 qvarters = 2 stops = 1 kanna = 0·691 gall.; and 48 kannas = 1 tunna = 83·17 galls. Dry: 224 orts = 56 qvarters = 14 stops = 7 kannas = 1 fjerding = 0·5196 bush.; and 8 fjerdings = 2 spanns = 1 tunna = 4·157 bush. Weight (commercial): 128 qvintins = 32 lods = 16 uns = 1 skålpund = 0·9376 lb. avoird.; and 400 skålpunds = 20 lispunds = 1 skeppund = 375·04 lbs. The above are the old measures. The system has since been decimalized, but based upon former units; 100 linies = 10 tums = 1 fot = 11·679 in.; 100 fots = 10 stangs = 1 ref. In both wet and dry capacity measure the cubic tum, cubic fot, &c., are used. In weight 100 korrs = 1 ort; 100 orts = 1 skålpund = 0·93379 lb.; 100 skålpunds = 1 centner; 100 centners = 1 last. The metric system is to go into effect in 1878.

Switzerland.—Prior to 1856 almost every canton had different measures; the present uniform system is semi-metric, and is in general use. Length: 100 lignes = 10 pouces = 1 pied = 30 centimètres or 11·8112 in.; 10 pieds = 1 perche; 16,000 pieds = 1 lieue = 2·983 m. Surface: the arpent, 400 pieds square = 3·558 acres. Liquid: the pot, 1·5 litre or 1·585 quart, is subdivided into ½, ¼, ⅛; 100 pots = 1 muld = 4 setier. Dry: 10 émines = 1 quateron = 15 litres or 0·4257 bush. Weight: the livre or pfund = 500 grammes or 1·1023 lb.; 100 livres = 1 quintal; 32 loth = 16 onces = 1 livre. In the German cantons the German names are used.

Tripoli.—The Turkish dreah or pic = 3 palmi = 26·42 in.; the less dreah = 19·03 in. The barile = 24 bozze = 17·12 galls. The ueba = 4 temen = 16 orbahs = 3·05 bush. The okie = 1 oz. troy; 1,600 okies = 100 rottols = 1 cantar = 109·7 lbs. avoird.

Turkey.—The pic or pike is 26·8 in.; the almud, 1·382 gall.; the killow, 0·940 bush. Weight: 400 drams = 4 chequees = 1 oke = 2·8286 lbs. avoird.; and 45 okes = 1 kintal or cantaro = 127·3 lbs. at Smyrna, but 140·3 lbs. at Constantinople.

Tuscany.—The palmo is 0·9575 ft.; the braccio, 1·915 ft.; the barile (wine) = 20 fiaschi = 40 boccali = 12·04 galls.; the sacco = 3 staja = 12 quarti = 2·075 bush.; the libbra = 12 once = 96 dramme = 0·7486 lb. avoird. (See *Italy.*)

United States.—For the value of the several units of weight and measure, see the preceding general article. Length: 6 points = 1 line; 144 lines or 36 barleycorns = 12 inches = 1 foot; 16½ ft. = 5½ yards = 1 rod, pole, or perch; 320 rods = 80 chains = 8 furlongs = 1 mile (1,760 yds. or 5,280 ft.); 1 chain = 100 links, each of 7·92 in. The nail is 2¼ in.; the palm, 3 in.; the hand, 4 in.; the span, 9 in.; the quarter of cloth, 9 in.; the ell, Flemish, English, and French, respectively 3, 5, and 6 quarters; the cubit, 1½ ft.; the pace, 5 ft.; the fathom, 6 ft.; a cable's length, 120 fathoms; a league, 3 m.; a degree of the meridian, 69·046 m. Surface: 144 sq. in. = 1 sq. ft.; 272¼ sq. ft. = 30¼ sq. yds. = 1 sq. rod; 160 sq. rods = 4 roods = 1 sq. acre; 640 sq. acres = 1 sq. mile. Also, 160 sq. rods = 10 chains = 1 sq. acre. Solid or cubic measure: 1,728 solid inches = 1 solid foot; 27 solid feet = 1 solid yard; 40 ft. of round timber, or 50 ft. of hewn = 1 ton or load; 128 solid feet = 1 cord (of wood). Liquid.—1. Wine measure: 32 gills = 8 pints = 4 quarts = 1 gallon; 63 gallons = 2 barrels = 1 hogshead; and 4 hogsheads = 2 pipes = 1 tun. 2. Beer measure: 8 pints = 4 quarts = 1 gallon; 36 gallons = 1 barrel; 54 gallons = 1 hogshead. Dry: 64 pints = 32 quarts = 4 pecks = 1 bushel; and 36 bushels = 1 chaldron. Weight.—1. Avoirdupois: 7,000 grains = 256 drams = 16 ounces = 1 pound; 112 lbs. = 4 quarters = 1 hundred weight; and 20 hundred weight = 1 ton. The hundred weight of 100 lbs. is coming into more general use. 2. Troy: 24 grains = 1 pennyweight; and 240 dwt. = 12 ounces = 1 pound troy, of 5,760 grains; this is the mint weight. 3. Apothecaries': 480 grains = 24 scruples = 8 drams = 1 ounce; and 12 ounces = 1 pound. The pound and ounce in this weight are the same as in troy weight.

Venetia.—In the decimal system, introduced in 1803, the metro or braccio = 10 palmi = 100 diti = the French mètre, and 1,000 metri = 1 miglio; the soma = 10 mine = 2·7512 bush.; the libbra metrica = 10 once = 100 grossi = 1,000 denari = 2·2046 lbs. avoird.

West Indies.—In those now or originally belonging to England, France, Holland, and Denmark, respectively, the British, French, Dutch, and Danish systems chiefly prevail. Spanish measures are partly in use in Trinidad, however; the Spanish vara in Curaçoa; and in some of the Danish isles the British yard and the old French aune = 46·85 in.

WEIL, Gustav, a German orientalist of Jewish parentage, born at Sulzburg, Baden, April 24, 1808. After studying Hebrew theology he devoted himself to oriental literature, and in 1830 went to Cairo, where he remained five years, studying under Arabian, Persian, and Turkish teachers. In 1845 he became extraordinary and in 1861 ordinary professor of oriental languages at Heidelberg. He has published a new translation of the Arabian Nights (4 vols., Stuttgart, 1837-'41; 2d ed., 1866); *Die poetische Literatur der Araber* (1837); *Mohammed der Prophet* (1843); *Historisch-kritische Einleitung in den Koran* (Bielefeld, 1844); *Geschichte der Khalifen* (5 vols., Mannheim, 1846–'62); *Das Leben Mohammed's nach Mohammed ibn Ischak bearbeitet von Abd el-Malik ibn Hischam* (2 vols., Stuttgart, 1864); and *Geschichte der islamitischen Völker von Mohammed bis zur Zeit des Sultans Selim* (1866).

WEILEN, Joseph, a German poet, whose real name is Weil, born at Tetin, Bohemia, Dec. 28, 1828. After studying at Prague and Vienna, and taking part in the Hungarian war, he was professor of history and geography in military academies from 1852 to 1861, when he became director of the court library at Vienna, and professor of German language and literature at the school of the general staff. His *Phantasien und Lieder* (Vienna, 1853) and *Männer vom Schwerte* (3d ed., 1854–'5), and his tragedies, make him the chief representative of Halm's school of lyric and dramatic literature. His tragedies include *Tristan* (Breslau, 1860; 2d ed., 1872), *Edda* (Vienna, 1865), *Rosamunde* (1868), *Graf Hoorn* (Leipsic, 1871), *Der neue Achilles* (1872), and *Dolores* (Stuttgart, 1874).

WEIMAR, a city of Germany, capital of the grand duchy of Saxe-Weimar-Eisenach, on the Ilm, 53 m. S. W. of Leipsic; pop. in 1871, 15,998. It was long celebrated as the northern Athens, on account of the residence here of Goethe, Schiller, and other authors, and still is a favorite residence of distinguished artists. The new wing of the grand ducal palace is decorated with frescoes relating to the great German poets. Connected with the palace is a fine park. There is a large public library in a small château formerly known as *das französische Schlösschen*, containing David's colossal bust of Goethe, Dannecker's of Schiller, and other works of art. A new museum has been provided for the art collection of the Witthum palace. The theatre, which became famous under Goethe's and Schiller's management, was rebuilt in 1825. The monuments include Rietschel's double statue of Goethe and Schiller on the Theaterplatz, Schaller's Herder on the Herderplatz, Gasser's Wieland on the Wielandplatz, and those in the principal Protestant church, over the tombs of the local sovereigns and that of Herder. The same building contains one of Lucas Cranach's finest altarpieces. Prominent among the educational institutions are the gymnasium and the free school of design and art school. The grand duke Charles Augustus, the son of the famous duchess Amalia (see AMALIA, and CHARLES AUGUSTUS), and his friend Goethe, as well as Schiller, are buried in the grand ducal vault in the new cemetery. The city abounds with the memories of the most brilliant period of German literature. The centennial of Goethe's arrival at Weimar was celebrated in 1875.

WEIMAR, Bernhard, duke of. See BERNHARD.

WEIR, Harrison William. See supplement.

WEIR, Robert Walter, an American painter, born in New Rochelle, N. Y., June 18, 1803. He studied in Italy in 1824–'7, and in 1834 he was appointed instructor in, and since 1846 has been professor of, drawing at West Point. His best works are "Red Jacket," "The Antiquary introducing Lovel to his Womankind," "Bourbon's Last March," "The Landing of Hendrik Hudson," "Columbus before the Council of Salamanca," "The Embarkation of the Pilgrims," in the rotunda of the capitol at Washington, and the "Indian Captives," in the Boston Athenæum. Among noted pictures in private collections in New York are his "View of the Hudson from West Point," "The Greek Girl," "Pæstum by Moonlight," "A Pier at Venice," a cabinet copy of "The Embarkation of the Pilgrims," and "Rebecca" from "Ivanhoe."—His son, JOHN FERGUSON WEIR, since 1869 professor of painting and design in the Yale college school of fine arts, has painted "The Gun Foundery," "Column of St. Mark, Venice," "Lago Maggiore," "The Confessional," "Christmas Bell," and "Culprit Fay."

WEISBACH, Julius, a German mathematician, born near Annaberg, Saxony, Aug. 10, 1806, died in Freiberg, Feb. 24, 1871. He studied at Freiberg, Göttingen, and Vienna, and in 1833 became professor of applied mathematics in the Freiberg academy. By his introduction of the "coefficient of resistance" into mathematical calculations, and his discovery of the "incomplete contraction" of water, according to the nature of the orifice whence it flows, he greatly simplified and advanced the science of hydraulics. The most important of his numerous works are: *Lehrbuch der Ingenieur- und Maschinenmechanik* (3 vols., Brunswick, 1845–'54; new ed., 1868–'70; English translations of the first two volumes by L. Gordon, London, 1847–'8, and by W. R. Johnson, Philadelphia, 1849), and *Der Ingenieur* (Brunswick, 1848; 5th ed., 1869).

WEISHAUPT, Adam, the founder of the order of the Illuminati, born in Ingolstadt, Feb. 6, 1748, died in Gotha, Nov. 18, 1830. He was educated in his native place, where he became in 1772 extraordinary professor of law, and in 1775 professor of natural and canon law. In 1776 he founded a secret society for the propagation of peculiar humanitarian views. (See ILLUMINATI.) In 1785 he retired to Gotha, where he was made councillor of state. His most important writings are: *Apologie der Illuminaten* (Frankfort and Leipsic, 1786); *Das verbesserte System der Illuminaten* (1787); *Pythagoras, oder Betrachtung über die geheime Welt- und Regierungskunst* (Frankfort, 1790); *Materialien zur Beförderung der Welt- und Menschenkunde* (3 vols., Gotha, 1810); *Ueber Staatsausgaben* (Landshut, 1820); and *Ueber das Besteuerungssystem* (1820).

WEISSENBURG, a county of Hungary. See STUHL-WEISSENBURG.

WEISSENBURG, or **Kronweissenburg** (Fr. *Wissembourg*), a town of Alsace, Germany, formerly a strongly fortified place in the French department of Bas-Rhin, on the Lauter, 32 m. N. N. E. of Strasburg; pop. in 1871, 5,886. It has several churches and schools and various manufactories. On Aug. 4, 1870, it was taken by the Germans under the crown prince of Prussia, after a victory over a division of MacMahon's army commanded by Gen. Abel Douay, who fell in the action; and subsequently the fortifications were razed.

WEISSENFELS, a town of Prussia, in the province of Saxony, on the right bank of the Saale, 19 m. S. by W. of Halle; pop. in 1871, 15,443. It has two churches, a normal school, a deaf and dumb asylum, and manufactories of porcelain, merinoes, and other articles. In the adjoining castle of Augustusburg are the barracks. From 1657 to 1746 the town was the capital of an independent duchy, Saxe-Weissenfels, a branch of the Saxon electorate.

WELBY, Amelia B. (Coppuck), an American poetess, born in St. Michael's, Md., in 1821, died in Louisville, Ky., May 3, 1852. In 1838 she married George B. Welby, a merchant of Louisville. She gained considerable literary reputation at an early age by poetical contributions, first published in the "Louisville Journal" under the signature of Amelia. These were collected and published in a small octavo volume at Boston in 1844, which passed rapidly through several editions. A larger collection of her poetical works appeared at New York in 1850, with illustrations by R. W. Weir.

WELD (Span. *gualda*), a plant, probably native to southern Europe, cultivated as a dyeing material. It is also called dyers' weed, dyers' rocket, and dyers' mignonette. It belongs to the same genus with the garden mignonette, and is *reseda luteola.* Weld is an erect, stiff, rarely branching annual or biennial, 1 to 2 ft. high, with linear or lanceolate, entire leaves, 2 to 3 in. long, and yellowish green flowers in long, stiff spikes. It is occasionally found along roadsides in this country, and in England is very common in waste places. Before commercial dyes were so numerous, weld was largely cultivated for the yellow dye yielded by the whole plant, but more especially by the seeds. The seed is sown broadcast, and the next year, when the flowers have opened quite to the top of the spike, the whole plant is pulled and dried. It is used to dye cotton, woollen, silks, and other materials various shades of yellow, and as a basis for a green dye; alum, cream of tartar, and chloride of tin are among the mordants used. The coloring principle is called luteoline; by the action of the air this changes into luteoleine, which crystallizes in golden yellow plates. The yellow water color called Dutch pink is obtained from weld.

Weld (Reseda luteola).

WELD, the N. E. county of Colorado, bordering on Wyoming and Nebraska, and intersected by the South Platte and its tributaries; area, about 11,000 sq. m.; pop. in 1870, 1,636. It is wholly situated in the "plains;" the surface is diversified, and is mostly covered with grasses and other vegetation. There is little wood, but extensive beds of coal are found, and iron ore in the W. part. The valleys of the streams are very fertile; irrigation is necessary, and except in the S. E. part is readily obtained. It is crossed in the west by the Denver Pacific railroad. The chief productions in 1870 were 8,307 bushels of wheat, 1,960 of rye, 9,550 of Indian corn, 24,207 of oats, 8,065 of potatoes, 58,043 lbs. of wool, and 4,553 tons of hay. There were 681 horses, 1,462 milch cows, and 3,406 other cattle. Capital, Greeley.

WELD. I. Theodore Dwight, an American philanthropist, born at Hampton, Windham co., Conn., Nov. 23, 1803. In 1825 he entered Hamilton college at Clinton, N. Y.; but his eyes failed. In 1830 he was appointed general agent of the society for the promotion of manual labor in literary institutions, on which subject he published a valuable report in 1833. He entered Lane theological seminary in 1833; but when the trustees suppressed the anti-slavery society in the institution, he led the secession which resulted in the transfer of all the students but six to Oberlin. He now became a prominent abolitionist lecturer. In 1836 he lost his voice, and the American anti-slavery society appointed him editor of all its publications not periodical. He wrote many pamphlets issued by the society, and books entitled "The Bible Against Slavery," "American Slavery as it is," and "The Power of Congress over the District of Columbia." In 1841–'3 he was in Washington in the employment of the anti-slavery members of congress. In 1854 he established the Eagleswood school at Perth Amboy, N. J., and in 1864 removed to Hyde Park, near Boston, where he has since resided, occupied chiefly in lecturing. **II. Angelina Emily Grimké**, wife of the preceding, born in Charleston, S. C., Feb. 20, 1805. She was the daughter of a judge of the supreme court of South Carolina. (See GRIMKÉ.) In 1828, with her elder sister, Sarah Moore Grimké, she joined the society of Friends in Philadelphia; and in 1836, having become an abolitionist and emancipated her slaves, she published an "Appeal to the Christian Women of the South," which was republished in England with an introduction by George Thompson, the anti-slavery orator. In that year she and her sister, at the request of the American anti-slavery society, began to make public speeches against slavery in New York and New England, which created much excitement and contributed powerfully to the progress of anti-slavery, especially by the eloquence of Angelina. The controversy caused by their appearance as public speakers was the beginning of the woman's rights agitation in this country. Angelina married Mr. Weld May 14, 1838.

WELHAVEN, Johan Sebastian Cammermeier, a Norwegian poet, born in Bergen, Dec. 22, 1807, died in Christiania in November, 1873. He was educated at the university of Christiania, and published in 1832 a pamphlet in Danish against the provincialism and conventionality of Wergeland. For 30 years he was professor of philosophy at the university of Christiania. He was one of the most accomplished poets of his day. His collected works are in 8 vols. (Christiania, 1868).

WELLAND, a river of Ontario, Canada, which flows generally E. for about 60 m. to the Niagara river above the falls. It is worthy of notice as constituting part of the Welland canal, which forms a navigable connection for vessels of 500 tons between Lakes Erie and Ontario. (See CANAL, vol. iii., p. 687.)

WELLAND, a S. county of Ontario, Canada, bounded E. by Niagara river and S. by Lake Erie; area, 395 sq. m.; pop. in 1871, 25,760, of whom 7,995 were of German, 7,863 of English, 5,765 of Irish, and 2,538 of Scotch origin or descent. It is drained by the Welland river, and is traversed by the Welland canal and several railroads. The surface is mostly level and the soil adapted to wheat. Capital, Welland.

WELLES, Gideon. See supplement.

WELLESLEY, a province of the British colony of the Straits Settlements, comprising a part of the W. coast of the Malay Peninsula, between the Quedah and Perak rivers, and the island of Penang opposite to it (see PENANG); area, 343 sq. m.; pop. in 1871, 133,230. The mainland portion (area, 236 sq. m., pop. 71,433) is bounded N. by the native state of Quedah, E. by Siam, and W. by the strait of Malacca. On the south, between it and the British province of Malacca, are several native states, called respectively Larut, Perak, Klang, Salangore, Sunjie, Ujong, and Rumbowe, all of which have lately been brought under British supremacy. Several of them, especially Larut, are very rich in tin, gold, galena, and other minerals, and contribute largely to the commerce of Penang. The surface of Wellesley is undulating, with extensive alluvial tracts and a few sandy strips. The climate is hot, averaging 80°, and more rain falls than in Penang, but the country is not considered unhealthful. The soil is remarkably fertile, the vegetable products being similar to those of Penang. The elephant, tiger, rhinoceros, and many other wild animals abound. A large part of the province is under cultivation, chiefly by Chinese and Europeans, and sugar, rice, and tapioca are raised in considerable quantities. The inhabitants are principally Chinese and Malays. The British have constructed good roads into the interior, which is also accessible by several rivers, of which the Perak is the largest.—Wellesley was settled by the English in 1800. In 1873-'4 much trouble was experienced from the depredations of pirates belonging to the coast states, but after ships had been sent to the coast, and troops into the interior, peace was established, and the whole coast will probably be annexed to the Straits Settlements.

WELLESLEY, Richard Colley, marquis Wellesley, a British statesman, born in Dublin, June 20, 1760, died at Kingston house, Brompton, Sept. 26, 1842. He was the eldest son of Garret, first earl of Mornington (see WELLINGTON, ARTHUR WELLESLEY), and was educated at Eton and Oxford. His father died in 1781, and the young earl entered political life, sitting in the Irish house of lords until the union, and being also elected a member of the British house of commons. In 1789, during the regency debate, he advocated in the Irish parliament the restriction of the prince's authority during what might be only a temporary malady of his father; and this coming to the notice of George III. upon his recovery, the earl was returned to the house of commons at the next election for Windsor, and was appointed a member of the Irish privy council. Subsequently he became one of the lords of the treasury, and in 1793 was sworn in as member of the British privy council. On Oct. 4, 1797, he was appointed governor general of India, and on the 20th was made Baron Wellesley in the British peerage. In May, 1798, he reached India, and found the finances of the East India company exhausted, the army and fortresses in a destitute condition, and the safety of the British territory threatened by the alliance of Tippoo Sultan with the French. Having strengthened the army, he marched in October into the territory of the nizam, and forced him to disband his French subsidiary troops; and in February, 1799, he sent Gen. Harris into the territory of Mysore from Madras, with an army of 30,000 men, which defeated that of Tippoo at Malaveli, and stormed Seringapatam (May 4). Tippoo was killed in the assault, his territories were divided, and Lord Wellesley's brother, Col. Arthur Wellesley (afterward duke of Wellington), was made governor of Mysore. The governor general was made, on Dec. 2, 1799, Marquis Wellesley in the peerage of Ireland. He now directed his efforts to developing the commercial interests of India, and made advantageous treaties with the nizam, the rajah of Tanjore, the sultan of Muscat, and the shah of Persia. In 1801 he sent an expedition to take part in the attack upon the French in Egypt. He also negotiated treaties securing the British possession of the frontier provinces of Oude, and the sovereignty of the Carnatic from the foot of the Mysore mountains to the coast of Coromandel. These new accessions brought Wellesley into contact with the powerful Mahratta chieftains, united by common danger, between whom and the English war soon broke out. The British army was divided into two bodies. The principal one, under the command of Gen. Lake, defeated on Aug. 29, 1803, the native forces under command of the French general Perron, drawn up before Alighur, stormed that fort Sept. 4, and on Sept. 11 again vanquished the enemy at Delhi, which city was surrendered the following day. The second division of the English army, under Gen. Arthur Wellesley, marched into the Deccan, and by the brilliant victory of Assaye and capture of Gawilghur forced the rajah of Berar to submit to a peace. Much complaint was expressed in England, however, not only at the vast expense of these movements, but at alleged acts of oppression toward the native rulers; and Lord Wellesley tendered his resignation, which was not accepted. In the mean while new hostilities broke out early in 1804, with serious disasters. In August, 1805, Lord Wellesley set sail for England, having been superseded by Lord Cornwallis. In the house of commons articles of impeachment were fruitlessly presented against him by Mr. Paul. In 1808 he was sent to Spain as ambassador, but was recalled in 1809, and became secretary of state for foreign affairs, which office he resigned early in 1812. In 1821 he was made lord lieutenant of Ireland, and his decided opinions in favor of Catholic claims led to great disturbances. In spite of much bitter opposition, especially from the Orangemen, Lord Wellesley greatly improved the internal condition of that country. On the accession of his brother, the duke of Wellington, to the head of the English ministry in 1828, he resigned on account of their disagreement on the Catholic question. He accepted office in the ministry of Earl Grey formed in 1830, in 1831 was made lord steward, and in 1833 was again appointed lord lieutenant of Ireland. This office he resigned when Sir Robert Peel became premier, and on the formation of the second Melbourne ministry in 1835 accepted the office of lord chamberlain, but in the course of the same year retired altogether from public life. The "Despatches, Minutes, and Correspondence of the Marquis Wellesley during his Administration in India" (5 vols. 8vo, 1837–'40) was published at the expense of the East India company; and in 1838 appeared his "Despatches and Correspondence during his Mission to Spain" (1 vol. 8vo). R. R. Pearce edited his "Memoirs and Correspondence" (3 vols., London, 1846).

WELLESLEY COLLEGE. See supplement.

WELLINGTON, a W. central county of Ontario, Canada, drained by Grand river; area, 1,278 sq. m.; pop. in 1871, 63,289, of whom 23,981 were of Irish, 18,557 of Scotch, 16,385 of English, and 3,134 of German origin or descent. It is traversed by the Grand Trunk railroad. Capital, Guelph.

WELLINGTON, a seaport city of New Zealand, capital of a province of the same name comprising the S. part of North island, and since 1865 of the colony, on Lambton harbor, an inlet of Cook's strait, 78 m. (150 m. by water) E. of Nelson; pop. in 1875, 10,507. It was the first settlement of the New Zealand company (1839–'40), its fine harbor, Port Nicholson, giving it great advantages. The principal buildings are the government house, houses of legislature, and cathedral. It is an Anglican and a Roman Catholic see, and there are 14 churches, a colonial museum, botanic garden, theatre, masonic and odd fellows' halls, gas and water works, three banks, and a weekly and two daily newspapers. The town is connected by railway with Upper Hutt, 18 m. distant. The principal exports are wool, tallow, timber, and gum.

WELLINGTON, Arthur Wellesley, duke of, a British soldier, born at Dangan castle, county Meath, or in Dublin, on or shortly before May 1, 1769, died at Walmer castle, near Deal, England, Sept. 14, 1852. He was the third son of Garret, first earl of Mornington, descended from the families of Wesley or Wellesley and Cowley or Colley, both of Anglo-Saxon origin, but long settled in Ireland. He was educated at Eton and the military school of Angers, France, and in 1787 was commissioned ensign. In January, 1795, as lieutenant colonel, he commanded the brigade which covered the retreat of the British force from Flanders. In 1796 he went as colonel with his regiment to India. In 1799, in the war waged by his brother (see WELLESLEY) with Tippoo Sultan, he took part in the victory of Malaveli and in the storming of Seringapatam, and was appointed governor of Mysore. In April, 1802, he was made major general. In 1803, in the Mahratta war, he occupied Poonah and took Ahmednuggur; on Sept. 23, with 2,000 British and 2,500 native troops and 18 guns, defeated a force of 26,000 infantry, 30,000 horse, and 100 guns at Assaye; and on Nov. 29 routed the Mahrattas at Argaum. He returned to England in March, 1805, and soon after entered parliament. In 1807 he was appointed chief secretary for Ireland, but accompanied the expedition which captured the Danish fleet at Copenhagen, commanding a part of the land force, received the thanks of parliament on his return, and resumed his office. In April, 1808, he was made lieutenant general and put in command of the force for the Peninsular war. He landed at Mondego bay Aug. 1, marched toward Lisbon, on the 17th defeated Laborde at Roliça, and on the 21st repulsed Junot at Vimeiro. After the convention of Cintra and the French evacuation of Portugal, he returned to England, and in January, 1809, resumed his seat in parliament. In April he went to Lisbon as commander-in-chief of the Peninsular forces, the Portuguese regency also making him marshal general of its army. The British had suffered severe reverses. The French occupied a large part of Spain; in Portugal, Soult at Oporto held the N. part, and the E. part was menaced by Victor at Mérida and by King Joseph at Madrid. Beresford marched against Soult, and on May 12 captured Oporto, the French retreating across the mountains into Spain. On July 27 and 28 Wellesley, with 22,000 British troops and the undisciplined Spanish levies commanded by the incapable Cuesta, defeated 50,000 French at Talavera; but he was unable to follow the retreating army, the blunders of Cuesta compelling him to fall back, and the French reoccupied the place. The British army was suffering for want of supplies; dysentery was epidemic; 5,000 men died in hospital; and of the whole force but few were fit for duty. Falling back to the Portuguese frontier, Wellesley began his triple line of intrenchments at Torres Vedras, which, with the naturally strong ground, was to give him a defensive position 30 m. in extent, flanked on one side by the Tagus and on the other by the Atlantic. On Sept. 4 he was raised to the peerage as Baron Douro of Wellesley and Viscount Wellington of Talavera and of Somerset. By the close of the year Napoleon had sent 365,000 men across the Pyrenees, and Soult with one army overran Andalusia, while Masséna with another marched against Wellington. The British still held their posts on the borders of Spain, and neither the capture of Ciudad Rodrigo nor the investment of Almeida could tempt Wellington from his position. On Aug. 4, 1810, he ordered the people of all that part of Portugal which he could not protect to evacuate their homes, drive off their cattle, and destroy such stores as they could not carry. The army then fell back upon Torres Vedras, accompanied by crowds of fugitives, some of whom took refuge in Lisbon, while the rest fled to the provinces far from the scene of war. Masséna, following, found the country laid waste and destitute of supplies. On Sept. 27 Wellington repulsed him at Busaco, and on Oct. 8 entered the lines of Torres Vedras. On the 10th Masséna was in front of these works, which mounted 600 guns. The British fleet in the Tagus reënforced the defenders, and by the end of the month there were nearly 100,000 allies within the lines. In November Masséna retreated, Wellington followed him across the frontier, invested Almeida, and went to confer with Beresford near Badajoz, which had surrendered to Soult. Masséna turned to attack the allies in their leader's absence; but Wellington came back in time to repel the assaults, May 3 and 5, 1811, at Fuentes de Onoro, and soon after Almeida fell. Portugal could now organize troops, but before making offensive movements Ciudad Rodrigo and Badajoz must be recovered. The first Wellington carried by assault, Jan. 19, 1812, for which he was made earl of Wellington, Spanish duke of Ciudad Rodrigo, and Portuguese marquis of Torres Vedras; and on the night of April 6 Badajoz was taken. To prevent Soult from joining Marmont or Joseph Bonaparte, Wellington destroyed the bridge over the Tagus at Almaraz, and moved against Marmont, who fell back till the Douro was between them. On July 21 both armies crossed the Tormes, and on the next day was fought the battle of Salamanca. Marmont, to cut off Wellington from Portugal, extended his left toward Ciudad Rodrigo. Wellington made a rapid change of front to the right; this Marmont mistook for a retreat, and further extended his left to intercept the British. Wellington strengthened his right, fell on the French in front and flank, crushed their left wing, drove back their centre, and completely routed them in a short, sharp action, which a French officer described as "beating 40,000 men in 40 minutes." The results were the evacuation of Madrid, which the allies entered on Aug. 12, the raising of the siege of Cadiz, and the freeing of Andalusia and Castile from military occupation. Wellington's investment of Burgos to open a northern line of operations was a failure. Soult had joined Joseph Bonaparte, Marmont had reënforced and reorganized his army, and Wellington retreated toward Portugal, finally halting on the banks of the Agueda. The failure before Burgos and the evacuation of Spain called out the severest censure; but the prince regent made Wellington a marquis, parliament gave him £200,000, large reenforcements, especially of cavalry, were forwarded, and in 1813 he resumed the offensive with 200,000 men. The French, with a little larger force, stretched across Spain from Valencia to Galicia. Wellington moved against their centre on the Douro, forced Joseph Bonaparte across the Ebro, and then changed his base to the N. coast of Spain, suddenly appearing on the flank of the retreating French. In the battle of Vitoria, June 21, the British attacked the enemy at several points simultaneously, which resulted in a disorderly flight of the French toward Pamplona, and the capture by the victors of an immense quantity of plunder, baggage, supplies, and artillery. The main French army was driven into the Pyrenees, and all Spain except Catalonia and Aragon was free. For this Wellington was made a field marshal. Soult now commanded the French army, with the advanced posts of St. Sebastian and Pamplona; and while Graham laid siege to the former place and O'Donnell's Spanish force to the latter, Wellington covered both operations by pushing his main body between them to the passes of the Pyrenees from Fuenterrabia to Roncesvalles, where he had a series of engagements with Soult, and drove him into France. On Aug. 31 St. Sebastian was taken by storm. On Oct. 7 Wellington crossed the Bidassoa, cut off Soult from Bayonne, and blockaded 13,000 men in garrison in that fortress. He issued stringent orders to protect the population, but could not restrain his allies from plunder, and so sent them back to Spain. On Oct. 31 Pamplona surrendered. On Feb. 27, 1814, Wellington defeated Soult at Orthez, and sending Beresford to occupy Bordeaux, he forced Soult back to Toulouse, and there again defeated him on April 10. He entered the city on the 12th, heard of the occupation of the French capital by the allies, and left for Paris on the 30th. In May he was made duke. In June he returned to London, where he received the thanks of parliament and a pension of £10,000. In August he was sent as ambassador to Paris. In January, 1815, he replaced Lord Castlereagh in the congress of Vienna. When Napoleon returned from Elba Wellington urged the sending of a large force to the Netherlands, of which he took command in April, fixing his headquarters at Brussels. On June 18 he fought his final battle. (See WATERLOO.) On June 21 he crossed the French frontier and marched upon Paris, where on his arrival an armistice was concluded. In his treatment of the vanquished he showed himself superior to Blücher, Gneisenau, and other allied generals. His share of Waterloo prize money was £60,000. The king of the Netherlands made him prince of Waterloo. In 1817 the British nation gave him the estate of Strathfieldsaye, Hampshire, costing £263,000. In 1818 he was made field marshal of Austria, Prussia, and Russia, attended the congress of Aix-la-Chapelle, and sat in parliament, where he rarely took part in debate, but steadily voted with the tories. On Jan. 1, 1819, he was made master general of ordnance, thus obtaining a seat in the cabinet, which he held till the dissolution of the Liverpool ministry in February, 1827. In October, 1819, he was gazetted governor of Plymouth. In 1822 he attended the congress of Verona, in 1826 was ambassador at St. Petersburg, and in 1827 succeeded the duke of York as commander-in-chief. From January, 1828, to November, 1830, he was prime minister, resigning his command of the army, but resuming it in 1842 and holding it till his death. During his premiership he assented to the Catholic emancipation bill, which he had previously opposed, his change of opinion leading to many newspaper attacks, and to a duel with Lord Winchelsea in which neither was harmed. In 1829 he was made governor of Dover and warden of the cinque ports. In 1832 he opposed the reform bill, for which he was hooted at in the streets, the windows of Apsley house, his town residence, were smashed, and an attempt was made to burn his country house. In January, 1834, he was installed as chancellor of the university of Oxford. In 1834–'5 he was secretary of state for foreign affairs; and in 1841 he again became a member of the cabinet as minister without office, and supported Peel in his free-trade measures. In 1845–'6 he was president of the privy council. On June 22, 1852, he made his last speech in parliament. His death, from apoplexy, was generally considered a blow to the whole country, and the public grief was profound. His body lay in state five days at Chelsea, and on Nov. 22 a public funeral of unprecedented magnificence and honors followed his remains to St. Paul's cathedral. In person the duke was of middle height, strongly built, with keen gray eyes, a long face, an aquiline nose, and a cheerful countenance. He was apparently in full health the night before he died.—The more important biographies of Wellington are those of Wright (4 vols., London, 1839–'41), Maxwell (3 vols., 1839–'41; 6th ed., 1862), Stocqueler (2 vols., 1852–'3), Brialmont (3 vols., Paris, 1856–'7; English translation with emendations and additions by Gleig, 4 vols., London, 1858–'60; popular abridged ed. revised, 1875), and Yonge (2 vols., 1860). See also the "Despatches of the Duke of Wellington during his various Campaigns," &c. (13 vols., London, 1834–'9; 2d series, 12 vols., 1844–'65), edited by Col. Gurwood; and the "Supplementary Despatches and Memoranda" (17 vols., 1858–'73), edited by his son Arthur Richard, second duke of Wellington, who is preparing for publication (1876) a continuation of the supplementary series, with additional correspondence, and memoranda of the life of his father.

WELLS, a N. E. county of Indiana, intersected by the Wabash river; area, 372 sq. m.; pop. in 1870, 13,585. It has a rolling surface, and the soil is very fertile. There is an abundance of excellent timber. It is intersected by the Fort Wayne, Muncie, and Cincinnati railroad. The chief productions in 1870 were 238,000 bushels of wheat, 177,630 of Indian corn, 82,524 of oats, 27,758 of potatoes, 360,709 lbs. of butter, 19,365 of cheese, 63,336 of wool, and 12,413 tons of hay. There were 5,206 horses, 4,643 milch cows, 5,106 other cattle, 21,723 sheep, and 15,470 swine; 9 manufactories of carriages and wagons, 3 planing mills, and 28 saw mills. Capital, Bluffton.

WELLS, David Ames, an American economist, born in Springfield, Mass., June 17, 1828. He graduated at Williams college in 1847, and at the Lawrence scientific school in 1851. From 1865 to 1870 he was employed by the government as a commissioner to inquire into questions of revenue and taxation, and published 15 reports on these subjects, some of which were reproduced in England, France, and Germany. In 1870–'73 he was employed by the legislature of New York as a commissioner on taxation, and submitted two reports with a plan of a code, all republished in Europe. In 1872 he became university lecturer on political science in Yale college. In 1873 he delivered an address in London at the annual banquet of the Cobden club. In 1874 he was elected foreign associate of the French academy of political sciences, in the place of John Stuart Mill, deceased, and received the degree of D. C. L. from Oxford university. He resides in Norwich, Conn., and was defeated in April, 1876, as a democratic candidate for congress. He has also published pamphlets on economical subjects, and edited 16 volumes of the "Annual of Scientific Discovery" (1849–'64). Mr. Wells was originally a protectionist, but his investigations in Europe in 1867, and study of the United States customs system, led him to become an advocate of free trade.

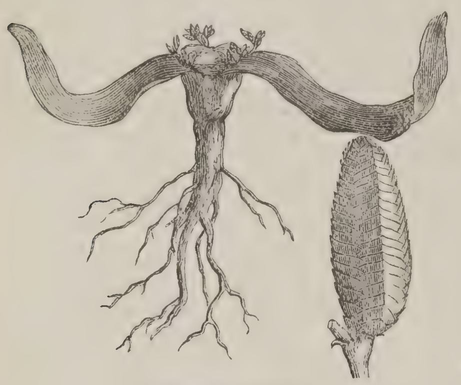
WELLS, Horace, an American dentist, one of the claimants of the discovery of anæsthesia, born in Hartford, Windsor co., Vt., Jan. 21, 1815, died in New York, Jan. 24, 1848. In 1834–'6 he studied and practised dentistry in Boston, and in 1836 opened an office in Hartford, Conn. Early in his practice he had considered the possibility of administering some anæsthetic to prevent pain in dental operations, and in 1840 the use of nitrous oxide gas occurred to him. On Dec. 10, 1844, Mr. G. Q. Colton lectured in Hartford and administered nitrous oxide gas to several persons, one of whom under its influence bruised himself severely by falling over some benches, but was unconscious of pain. Dr. Wells at once declared his belief "that a man, by taking that gas, could have a tooth extracted or a limb amputated, and not feel the pain." The next day he tested the matter in his own person, having a large molar tooth extracted without the slightest pain. He followed this by the successful administration of the gas in 12 or 15 cases of extraction of teeth during the autumn of 1844, and other dentists of the city successfully administered it in their practice. In December, 1844, he made known his discovery to Drs. Warren and Hayward, the distinguished chemist Dr. C. T. Jackson, Dr. W. T. G. Morton, a dentist and a former pupil of his, and others in Boston. Dr. Warren invited him to address his medical class, but he was too diffident to make a very satisfactory impression. He extracted a tooth for a patient under anæsthetic influence in the presence of the medical class; but the experiment was not sufficiently successful to excite much interest in the subject. In October, 1846, when Dr. Morton applied for a patent (which he obtained in November) for anæsthetic agents, Dr. Wells remonstrated, stated the results of his own experiments, and adduced the testimony of the surgeons and physicians of Hartford to their success. In December of the same year he sailed for France, to lay his discovery before the medical profession, and succeeded in convincing the medical society of Paris that he had made a valuable discovery. In the spring of 1847 he returned to America, and on March 30 published a pamphlet entitled "A History of the Discovery of the Application of Nitrous Oxide Gas, Ether, and other Vapors to Surgical Operations," in which he stated the results of his experiments as above related, and sustained them by several affidavits. The controversy which followed impaired his already enfeebled health, and, with his experiments on himself of the effects of chloroform, produced mental aberration. He had removed to New York, where he was arrested on a charge of throwing vitriol on the clothes of women in the street; and this causing an aggravation of his mental disorder, he committed suicide. In 1853, when an amendment to the congressional appropriation bill was offered providing for a grant of $100,000 to the "discoverer of practical anæsthesia," a report giving evidence in regard to Dr. Wells's claims was presented by Senator Truman Smith, who published it under the title of "An Examination of the Question of Anæsthesia" (Boston, 1859), and also "An Inquiry into the Origin of Modern Anæsthesia" (Hartford, 1867). A memorial statue of Wells has been erected in the public park of Hartford, Conn. (See ANÆSTHETICS; JACKSON, CHARLES THOMAS; and MORTON, WILLIAM THOMAS GREEN.)

WELLS, Samuel Roberts, an American phrenologist, born in West Hartford, Conn., April 4, 1820, died in New York, April 13, 1875. In 1844 he became a partner in the publishing house of O. S. and L. N. Fowler in New York, under the name of Fowlers and Wells, and in 1863 became sole proprietor. He accompanied L. N. Fowler in extended phrenological lecturing tours through the United States, Canada, and Great Britain. From 1850 to 1862 he edited the "Water Cure Journal," from 1863 till his death the "Phrenological Journal," and from 1865 the "Annual of Phrenology and Physiognomy." His more important publications are: "New Physiognomy" (New York, 1866), "How to Read Character" (1869), and "Wedlock" (1869).

WELLS, William Charles, a British physician, born in Charleston S. C., in May, 1757, died in London, Aug. 28, 1817. He studied medicine at the university of Edinburgh, served as surgeon to a Scotch regiment in Holland, and in 1785 established himself in London. In 1800 he became physician to St. Thomas's hospital. He is best known by an "Essay on Dew" (1814; new ed., 1866). (See DEW.) His autobiography was published in 1818.

WELLWOOD. See MONCREIFF.

WELWITSCHIA. In 1863, Dr. Welwitsch discovered at Mossamedes, on the W. coast of Africa, a remarkable plant which Dr. J. D. Hooker described as *Welwitschia mirabilis.* Unlike other plants in appearance, its reproductive organs place it among the *Gnetaceæ,* a small family closely related to the conifers. The plant is never over a foot high, while its trunk is sometimes 5 or 6 ft. in diameter; the cotyledons, or seed leaves, which in most plants soon perish, in this continue to grow, and, though the plant may live for more than a century, these are all the leaves or foliaceous organs it ever has. All the vegetative portions of the plant are the short, broad trunk, rapidly tapering to a strong descending root, and the cotyledons, which reach the length of 6 ft. and the width of 2 or 3 ft., and spread out upon the ground in opposite directions; they are green, very thick and leathery, and are often torn into segments or split up into shreds by the winds. The trunk each year increases slightly in diameter both above and below these leaves, so that they appear as if inserted in a deep slit or cavity; from this slit, at the upper side of the leaves, are produced the flower stalks, 6 to 12 in. high, much forked, and bearing at the end of each branch a cone the brilliant scarlet scales of which overlap each other in four rows, each containing a flower; when mature, the cones are about 2 in. long and half as thick. The country where this plant is found is a sandy and stony plateau from 300 to 400 ft. above the sea, where rain seldom or never falls; in some places the whole surface is completely studded with these tabular masses, varying in size from a few inches to 6 ft. across, which have been likened to gigantic hat blocks; it is computed that the trunks of 18 in. diameter are over 100 years old.



Welwitschia mirabilis.

WEN, an encysted tumor, usually growing upon some part of the hairy scalp. It consists of a closed sac, of fibrous texture, more or less closely connected with the neighboring parts, but generally capable of being enucleated entire by careful dissection, and filled with a soft, whitish, opaque, curdy material. The contents of the sac consist of granular fat mixed with fluid oil globules, a great abundance of epithelium scales, and very often crystals of cholesterine. Wens are regarded as usually resulting from the accidental closure and subsequent hypertrophy and distention of one of the sebaceous follicles, the epithelium cells and semi-solid oleaginous or sebaceous materials gradually accumulating. They become inconvenient after a time by the distention of the skin over their more prominent portion, but are usually easily removed by a simple surgical operation.

WENCESLAS, or **Wenzel,** a German emperor, of the house of Luxemburg, born in Nuremberg, Feb. 26, 1361, died near Prague, Aug. 16, 1419. He was the eldest son of Charles IV. and his third wife Anna, and was crowned king of Bohemia in his 3d year, and in his 18th succeeded his father as emperor. In a diet at Eger in 1389 he abandoned the cause of the cities, which he had before favored, and soon after annulled all debts due to Jews on the payment to himself of 15 to 30 per cent. of the amount; the mob of Prague having slaughtered 3,000 Jews, he also confiscated to his own use the property of the victims. He compelled the Bohemian nobles to return without payment the estates of the crown, on the pledge of which they had loaned money. He is also said to have tortured John Nepomucen with his own hand, and to have thrown him bound into the Moldau. (See NEPOMUCEN.) In 1394 Wenceslas was seized and imprisoned at Prague by a conspiracy among the nobles, headed by Jodocus of Moravia, but was set free at the instance of the German princes. In the controversy between the popes and antipopes, he adhered to the cause of the former until he finally united with France to urge the abdication of Boniface IX. and Benedict XIII. in order that a new pope might be chosen in place of the two. Hereupon several powerful German princes formally deposed him at Frankfort in 1400, electing as his successor Rupert of the Palatinate. New troubles in Bohemia resulted in his being seized by his brother Sigismund and imprisoned for 19 months in Vienna. He favored the agitation of Huss and his followers in Bohemia, out of hatred to the Catholic clergy. In 1410 he abdicated his claims to the imperial crown in favor of Sigismund, and, recklessly neglecting the affairs of his Bohemian kingdom, gave himself up to drinking and excesses till he died of apoplexy. His life has been written by Pelzel (2 vols., Prague, 1788–'90).

WENDS, the name of a Slavic tribe, forming a subdivision of the northwestern stem of the Slavs. (See SLAVIC RACE AND LANGUAGES.) Roman writers called all the Slavs with whom they were acquainted Venedi (Wends), and the Germans also gave the name of Wends to all Slavic peoples, but more especially to that division of them which Schafarik has designated as Polabs (embracing Obotrits, Sorabs, and others). These inhabited, from the 4th to the 9th century, the eastern portion of Germany, from the Saale and Elbe as far north as the Eider. Charlemagne drove the Wends back toward the Vistula, and by the close of the 13th century his successors in Germany had almost extirpated them. In the 16th century remnants of this Slavic population were still scattered over the whole region between Berlin and Frankfort-on-the-Oder, and there was a remnant of Wends also in Hanover, where they kept up their language until the middle of the 18th century. They are now found in portions of Brandenburg, Silesia, and the kingdom of Saxony, and principally on the banks of the Spree. Their number has been recently estimated at 136,000, of which Brandenburg and Saxony contain 50,000 each. Most of the Wends are Protestants, though a large proportion of those living in Saxony are Catholics. The name Southern Wends is often applied to the Winds in the Illyrian provinces of Austria. (See WINDS.)—The language of the Wends is similar to the other branches of the northwestern stem of the Slavic languages, the Polish and the Bohemian. It is divided into the dialect of Lower Lusatia, which is but little developed, and that of Upper Lusatia. The latter is subdivided into the evangelical dialect, near Bautzen; the Catholic dialect, near Kamenz and in the northwest; and the northeastern dialect. The differences are mostly confined to shades of pronunciation. The Wends have mostly made use of the German letters. There are eight vowels, *a*, *o*, *u*, *e*, *i*, all of which are pronounced as in German and Italian, *ó* (between *o* in *note* and *u* in *full*), *ē* (like long English *e*), and *y* (approaching the German *ü*). Of consonants there are 32: *j* (*y* consonant), *w* (*v*), *ẃ* (*v* soft), *b*, *b́* (soft), *p*, *ṕ* (soft), *m*, *ḿ* (soft), *n*, *ń* (soft, Fr. *gn*), *l*, *ł* (as in Polish), *r*, *ŕ* (soft), *z*, *ź* (Fr. *j*), *s*, *š* (*sh*), *d*, *dz*, *dź* (*dsh* soft), *ds*, *t*, *c* (*tz*), *ć* (*tch* soft), *č* (*tch*), *ts*, *h*, *ch* (*kh*), *g* (hard), *k*. There is no article. The substantives are of three genders, masculine, feminine, and neuter. Substantives ending in a consonant are mostly masculine, those in *a* and *i* feminine, and those in *o* and *e* neuter. There are seven declensions, two for the masculine, three for the neuter, and two for the feminine. The language has a dual number. There are seven cases, viz.: nominative, accusative, genitive, dative, locative (to express the relation of *in*), instrumental (to express the relations of *by* and *with*), and vocative. The adjectives end in *y*, *i* (masculine), *a* (feminine), *o* and *e* (neuter). The comparative is formed by the termination *iši*, and in order to form the superlative the syllable *naj* is placed before the comparative. The personal pronouns are irregular; the others are declined like adjectives. The verb has six tenses, present, imperfect, perfect, pluperfect, future, and future perfect; five moods, indicative, subjunctive, optative, imperative, and infinitive, besides a gerund; and three participles, present and perfect active, and perfect passive. The extent of the entire Wendish literature has been estimated at 300 volumes. The oldest monument of the language is a translation of the Epistle of St. James, dating from 1548 (edited by Lotze, Leipsic, 1867). There are grammars of the Wendish language by Ticinus (Prague, 1679), Matthäi (1721), Seiler (Bautzen, 1830), and Jordan (Prague, 1841).—See Giesebrecht, *Wendische Geschichten* (Berlin, 1843) and *Das hannöverische Wendland* (Lüchow, 1863), and Obermüller, *Die Urgeschichte der Wenden* (Leipsic, 1874).

WENTLETRAP, the popular name of the gasteropod shells of the genus *scalaria* (Lam.), from *scala*, a stair. The shell is long and turreted, with many whorls, close or separated, ornamented with numerous transverse prominent ribs; the mouth is circular and the lip continuous, closed with a horny operculum; the tube of the shell is perfect; the teeth are in numerous longitudinal series. More than 100 species are described, in nearly all the seas of the world, though most beautiful in the tropics, ranging from low-water mark to 80 fathoms; most of them are pure shining white, and they emit a purplish fluid when disturbed. The commonest species on the coast of New England is the *S. Grœnlandica* (Gould), about an inch long and a third of an inch in its greatest width; it is livid brown or bluish white, with ten close, moderately convex whorls, and white flattened ribs; it is abundant on the Grand Banks. There are several species on the coast of Europe, and many in the Indian ocean; one of the handsomest is the *S. pretiosa* (Lam.), of the China seas, 1½ to 2 in. long, snow-white or pale flesh-colored, with eight separated whorls.

Wentletrap (Scalaria pretiosa).

WENTWORTH, a S. county of Ontario, Canada, bounded N. E. by Lake Ontario; area, 454 sq. m.; pop. in 1871, 57,599, of whom 19,154 were of English, 16,737 of Irish, 12,415 of Scotch, and 7,036 of German origin or descent. It is watered by several streams, and traversed by the Great Western and the Hamilton and Lake Erie railways. Capital, Hamilton.

WENTWORTH, Charles Watson. See ROCKINGHAM.

WENTWORTH, Thomas. See STRAFFORD.

WENTWORTH. I. William, an early colonist of New Hampshire, born at Alford, Lincolnshire, England, in 1615, died in Dover, N. H., March 16, 1697. He was a follower of the Rev. John Wheelwright, with whom and 33 others he signed, Aug. 4, 1639, "A Combination for a Government at Exeter, N. H." He removed to Wells, Me., with Wheelwright; and when the latter went to England on the accession of Oliver Cromwell to power, Wentworth removed to Dover, where he was a ruling elder and often preached. He left a widow, nine sons, and one daughter, and was the progenitor of all the Wentworths of the United States whose origin is known. **II. John,** lieutenant governor of New Hampshire, grandson of the preceding, born in Portsmouth, N. H., Jan. 16, 1671, died there, Dec. 12, 1730. He was bred a sea captain. In 1711 he was appointed by Queen Anne a councillor for New Hampshire;

in 1713 he became a justice of the common pleas, and in 1717 lieutenant governor of the province, which was then dependent on Massachusetts. He left a widow and 14 children. **III. Benning**, governor of New Hampshire, eldest child of the preceding, born in Portsmouth, July 24, 1696, died there, Oct. 14, 1770. He graduated at Harvard college in 1715, became a merchant at Portsmouth, which town he frequently represented in the provincial assembly, was appointed a king's councillor, Oct. 12, 1734, and when in 1741 New Hampshire was made a distinct province he became its governor (Dec. 13), and so continued until 1767. He was authorized by the crown to grant patents of unoccupied land, and in 1749 began making grants in what is now southern Vermont. These grants were considered by the colonial government of New York as within its domain, and the collision so famous in the history of Vermont respecting the "New Hampshire grants" ensued. (See VERMONT.) Gov. Wentworth exacted heavy fees for his grants of land, and thus accumulated a large property. In each of them he stipulated for the reservation of a lot for an Episcopal church. After his resignation as governor he gave to Dartmouth college 500 acres of land, on which the college buildings were erected. He had by his first wife three children who lived to maturity, but died before him unmarried. He married, first, Abigail, daughter of John Ruck, of Boston, who died Nov. 8, 1755; and second, March 15, 1760, Martha Hilton, who had been brought up in his family, and was his housekeeper after his wife's death, upon which event Longfellow based his poem "Lady Wentworth." He made her sole heir of his large property. She afterward married Col. Michael Wentworth of the British army, and her only child, Martha, became the wife of Gov. John Wentworth's nephew, John Wentworth, author of "System of Pleading." **IV. Sir John**, governor of New Hampshire and afterward of Nova Scotia, nephew of the preceding, born in Portsmouth in 1736, died in Halifax, April 8, 1820. He graduated at Harvard college in 1755, was associated with his father Mark Hunking Wentworth as a merchant, and in 1765 was the agent of New Hampshire to present petitions in England. While there he gained the friendship of the marquis of Rockingham, through whose influence he was appointed to succeed Benning Wentworth as governor of New Hampshire, Aug. 11, 1766, and was at the same time appointed surveyor general of the king's woods in North America, with a salary of £700 and perquisites. He landed at Charleston, S. C., in March, 1768, and travelling northward by land registered his commission as surveyor in each of the colonies through which he passed. He entered on his duties as governor in June, 1768, and on Nov. 11, 1769, married his cousin, Frances Wentworth, widow of his and her cousin, the Hon. Theodore Atkinson, jr., and daughter of Samuel Wentworth of Boston. He had a house in Portsmouth, and a country seat at Wolfeborough. He gave Dartmouth college its charter, and endowed it with 44,000 acres of land, and also gave a piece of land to each member of the first graduating class. When in 1774 Gen. Gage found it impossible to procure carpenters to construct barracks for the royal troops in Boston, and Wentworth endeavored to procure them for him privately from Wolfeborough, the indignation of the people compelled him to take refuge first in Fort William and Mary, and then on board a British ship. After some vain efforts to stay the storm, he went to England, where he remained until peace was declared. He then removed to Nova Scotia and resumed his functions as surveyor of the king's woods, and on May 14, 1792, was appointed lieutenant governor of that province, which office he resigned in 1808. He was created a baronet in 1795, and was a doctor of laws of Oxford and Dartmouth. The baronetcy became extinct, April 10, 1844, on the death of his only child, Charles May, a graduate of Oxford, long private secretary to the earl of Fitzwilliam, who died unmarried at Kingsand, Devon, leaving the bulk of his property to his maternal cousin, Mrs. Catharine Frances Gore, the novelist. **V. John**, an American patriot, great-grandson of Elder William Wentworth, born in Dover, N. H., March 30, 1719, died in Somersworth, May 17, 1781. He was usually called "Col. John" or "Judge John," to distinguish him from others of the name. He was for many years a member of the provincial assemblies, was elected speaker in 1771, in 1773 became chief justice of the court of common pleas, and on Jan. 17, 1776, was chosen one of the superior judges, though he had never studied nor practised law. He was president of the first revolutionary convention held at Exeter, N. H., July 21, 1774. He survived his third wife, and left nine out of fourteen children. **VI. John**, jr., an American patriot, son of the preceding, born in Somersworth, N. H., July 17, 1745, died in Dover, Jan. 10, 1787. He graduated at Harvard college in 1768, studied law, served for many years in the state legislature, and was a member of the continental congress in 1778-'81. He was also a member of the New Hampshire committee of safety, which administered the government during the recess of the legislature. He left a wife and seven children. **VII. John**, an English lawyer, nephew of Gov. John Wentworth, born in Portsmouth, N. H., in 1768, died in Paris in 1816. He was taken to England about 1775, and educated as a lawyer. He wrote "System of Pleading" (10 vols., London, 1797), was appointed attorney general of Prince Edward's Island, removed to Portsmouth, N. H., where he married Martha, daughter of Gov. Benning Wentworth's widow by her second husband, Col. Michael Wentworth, and remained till 1816, when he returned to London and soon after died. **VIII. John**, an

American journalist, grandson of John Wentworth, jr., born in Sandwich, N. H., March 5, 1815. He graduated at Dartmouth college in 1836, and was editor of the Chicago "Democrat" from 1836 to 1861. He was elected to congress from Chicago in 1843, and was reelected five times, acting at first with the democratic and afterward with the republican party. He was elected mayor of Chicago in 1857, and again in 1860, and was a member of the convention of 1861 to revise the constitution of Illinois. He is the author of "Wentworth Genealogy" (2 vols. 8vo, 1870).

WERGELAND, Henrik Arnold, a Norwegian poet, born in Christiansand, June 17, 1808, died in Christiania, Aug. 12, 1845. He became director of the university library in Christiania, and in 1840 of the national archives. He was for a long time the most popular dramatic and especially lyric poet of Norway, but had many controversies with Welhaven and other opponents of his provincialism. He zealously advocated the rights of the Jews. His collected works are in 9 vols. (Christiania, 1852–'7). Select editions appeared in 1846 and 1859, and his biography by Lassen in 1867.

WERMLAND, a S. W. län of Sweden, in Svealand, bordering on Norway, and including Lake Wener in the south; area, 6,520 sq. m.; pop. in 1874, 265,027. Its capital, Carlstad, is situated on an island near the N. E. shore of Lake Wener. The lake has an area of about 2,000 sq. m., and, excepting Ladoga and Onega in Russia, is the largest lake in Europe. Its main affluent is the Klar, and among the finest mountains on its shores is the Kinnekulle, about 1,000 ft. high. Wermland is generally mountainous, and is richer in iron mines than any other part of Sweden, the principal being at Presberg. The drainage of the mining regions runs into Lake Wener.

WERNER, Abraham Gottlob, a German mineralogist, born at Wehrau, Upper Lusatia, Sept. 25, 1750, died in Dresden, June 30, 1817. He completed his studies at Freiberg and Leipsic, and from 1775 till his death was professor of mineralogy and geology at the Freiberg mining academy. He was early regarded as the first mineralogist of his time, and his lectures were attended by great numbers of students from all parts of Europe. He opened separate courses for various branches of study, and in 1785 one relating to geology, which he was the first to raise to the importance of a science by pointing out its application to the practical purposes of mining. As early as 1774 he had published *Von den äusserlichen Kennzeichen der Fossilien* (translated into French by Mme. Guyton de Morveau, Paris, 1790; into English by Weaver with notes, Wernerian society, Edinburgh, 1849–'50), which, though only a brief essay, was said by Cuvier to have revolutionized mineralogy by giving precision to the terminology and classification of that science. (See MINERALOGY, vol. xi., p. 589.) His principles were widely disseminated by his pupils, among whom were Karsten and Robert Jameson, the latter of whom about 1845 established at Edinburgh the Wernerian society. Antagonistic views on certain points were advocated by his contemporary Dr. Hutton of Edinburgh, and geologists were long divided into the Wernerian and Huttonian parties. (See GEOLOGY, vol. vii., pp. 688, 689.) He was never married. His few works include *Kurze Classification und Beschreibung der Gebirgsarten* (Dresden, 1787), and his celebrated *Neue Theorie über Entstehung der Gänge* (Freiberg, 1791; translated into French by Daubuisson, Paris, 1803; into English by Charles Anderson, "New Theory of the Formation of Veins, with its Application to the Art of Working Mines," Edinburgh, 1809). His collection and manuscripts came into the possession of the Freiberg academy. Cuvier's eulogy of him is included in his *Éloges historiques*, edited by Flourens (Paris, 1860). Sketches of his life have been written in German by Frisch (Leipsic, 1825), in Italian by Configliachi (Padua, 1827), and in English by Sir William Jardine for the "Naturalist's Library" (Edinburgh, 1837).

WERNER, Anton von, a German painter, born in Frankfort-on-the-Oder, May 9, 1843. He studied at the Berlin academy and under Adolph Schröder in Carlsruhe, whose daughter he married. His "Luther before Cajetan" (1865) and "Conradin of Hohenstaufen and Frederick of Baden hearing the Sentence of Death" (1866) won a prize and gave him the means of studying abroad. In 1870 he completed for the Kiel gymnasium "Luther before the Diet of Worms" and "The National Uprising of 1813." At the recommendation of the grand duke of Baden he was invited to the German headquarters in France. In 1873 he was commissioned by the emperor to execute the large fresco for the triumphal column in the Königsplatz, Berlin, which commemorates victories in the Schleswig-Holstein, Austrian, and Franco-German wars.

WERNER, Friedrich Ludwig Zacharias, a German dramatist, born in Königsberg, Nov. 18, 1768, died in Vienna, Jan. 18, 1823. He studied under Kant, held a civil office in Warsaw, and relinquished one in Berlin in order to travel. He met Goethe at Weimar and Mme. de Staël at Coppet, joined the Catholic church at Rome in 1811, and became a priest in Vienna. His *Der vierundzwanzigste Februar* (translated into French by Jules Lacroix, Paris, 1849), thus entitled because his mother and an intimate friend died on that day, introduced the era of the so-called tragedies of fate. Several of his dramatic poems were designed to evangelize freemasonry; most of them have been collected in 6 vols. (Vienna, 1817–'18), and his complete works, including sacred poems and sermons, in 14 vols., with his biography by Schütz (Grimma, 1839–'41).

WERNER, Karl, a German painter, born in Weimar, Oct. 4, 1808. He studied in Leipsic and Munich, resided chiefly in Rome from 1833 to 1853, in 1857 explored Spain, and in 1862 and 1867 the East. He excels in water-colors. His works include "Venice in her Zenith and Decline," "The Ducal Palace, with a Scene from the Merchant of Venice," "The Triumphal Procession of Doge Cantarini" (5 ft. high), "The Zisa Hall in Palermo," "The Lions' Court of the Alhambra," and "Jerusalem and the Holy Land," the last comprising 30 designs, published with text and colored plates (London, 1866-'7).

WESEL, a town of Rhenish Prussia, on the right bank of the Rhine, near the confluence of the Lippe, in the circle and 32 m. N. by W. of the city of Düsseldorf; pop. in 1871, 18,519, half Protestant and half Catholic. It is fortified, and the bridge of boats across the Rhine is protected by a citadel with five bastions. The fine Berlin gate has statues of Minerva and Hercules. The Gothic St. Willibrod is the most notable of the five churches. The gymnasium is of great antiquity and celebrity. It has sugar refineries and manufactories of stearine, paper, tobacco, and nails, and much shipping and inland trade. Under the original name of Lippemund it was of strategic importance in the wars of Charlemagne against the Saxons. Napoleon in 1805 incorporated it with the grand duchy of Berg, and in 1806 with the French empire; and on Sept. 16, 1809, he had 11 prisoners of war, officers of Schill's partisan corps, shot here. In 1813 it was blockaded by the Prussians, to whom it was in 1814 ceded by the treaty of Paris.

WESER (anc. *Visurgis*), a river of Germany, formed by the union of the Werra and the Fulda at Münden in the Prussian province of Hanover, and navigable throughout its length. It flows northward about 250 m. in a tortuous course, and falls into the North sea by an estuary 45 m. below Bremen. Its principal affluents are the Aller, from the right, and the Hunte, from the left. The most important towns on its banks are Bremen, the fortress of Minden, Rinteln, and Hameln.

WESLEY, or **Westley. I. Samuel,** an English clergyman, born in Preston in 1662, '66, or '68, according to different authorities, died April 30, 1735. He was the son of a dissenting minister, but early joined the church of England, was educated at Oxford, took orders, served a curacy in London for a year, and was then for another year chaplain on board a man-of-war. He was again a London curate for two years, during which he married and made some reputation as a writer for the press, and afterward obtained a small living in the country. He preached against King James's "Declaration for Liberty of Conscience" (1688), and when the revolution took place is said to have written a book in defence of it. Afterward he was presented to the livings of Epworth and Wroote in Lincolnshire. He wrote a heroic poem on "The Life of Christ" (fol., 1693); "Elegies on Queen Mary and Archbishop Tillotson" (fol., 1695); "The History of the New Testament attempted in Verse" (1701), followed by a similar "History of the Old Testament" (1704); a poem on the battle of Blenheim (1705), for which Marlborough made him chaplain of a regiment; a Latin commentary on the book of Job (edited by his eldest son, 1735); and a "Treatise on the Sacrament." According to his son John, he wrote the defence delivered by Dr. Sacheverell before the house of lords. **II. Samuel,** eldest (or at least eldest surviving) son of the preceding, born at Epworth in 1690 or 1692, died Nov. 6, 1739. He was educated at Westminster school and at Oxford, and was afterward for nearly 20 years an usher in the former. He took orders, but obtained no preferment. He viewed the "new faith" and peculiar conduct of his brothers John and Charles with strong disapprobation, and wrote a letter of remonstrance to his mother when he heard that she had become "one of Jack's congregation." At the time of his death he had been for seven years head master of Tiverton school. A collection of his poems, containing some remarkable humorous pieces, appeared in 1736. His correspondence with his brother forms the principal part of Dr. Priestley's collection of "Original Letters by the Reverend John Wesley and his Friends" (8vo, Birmingham, 1791). **III. John,** founder of Methodism, brother of the preceding, born at Epworth, Lincolnshire, June 17, 1703, died in London, March 2, 1791. His mother, Susannah, combined rare intellectual powers and indomitable will with refinement of manners and devotion to domestic duties. Her home was the family school, where the children were taught in the most thorough and methodical manner. In his 11th year John became a pupil of the Charterhouse, London, and in his 17th was elected to Christ Church college, Oxford. He was ordained deacon in 1725, elected a fellow of Lincoln college in 1726, and appointed Greek lecturer and moderator of the classes, and graduated as master of arts in 1727. The serious impressions produced by the writings of Thomas à Kempis and Jeremy Taylor were further deepened by those of William Law, especially by his "Serious Call." He became his father's curate at Wroote in August, 1727, was ordained priest in 1728, and returned to Oxford in November, 1729. Here he found a few young men, including his brother Charles, Robert Kirkham, and William Morgan, who were earnestly seeking a deeper religious experience. Of these and some 20 others, who were subsequently added, Wesley soon became the acknowledged leader. They spent much of their leisure time in religious exercises, in visiting almshouses and prisons, and in administering to the relief of the suffering. As tutor in Lincoln college, and as moderator in the daily disputations, Wesley continued at Oxford till 1735, devoting his entire leisure to earnest Biblical study and active Christian labors. At the repeated solicitations of Dr. John Burton and Gen. Oglethorpe, in 1735 he undertook a mission to the colony of Georgia, one of his chief objects being the conversion of the Indians. Accompanied by his brother Charles and two Oxford associates, he embarked in October. During the voyage he made the acquaintance of some Moravian missionaries, whose doctrines and composure in the midst of threatened death exerted a powerful influence on him. The rigid ecclesiastical discipline which he attempted to enforce was highly distasteful to many of the colonists, and Wesley was involved in a suit for defamation, which however was never brought to an issue. He returned to England in February, 1738, and immediately sought the society of the Moravians. He began diligently to examine their teachings, and received valuable aid from Peter Böhler, one of the missionaries then on their way from Herrnhut to Georgia. On the evening of May 24, 1738, he went to a meeting of the Moravian society in Aldersgate street, London, where was read Luther's preface to the Epistle to the Romans. Of the effect Wesley says: "I felt my heart strangely warmed. I felt I did trust Christ, Christ alone, for salvation; and an assurance was given me that he had taken away my sins, even mine, and saved me from the law of sin and death." This is his own account of his conversion, the vivid recollection of which he retained during all his life, and to which he often referred with the utmost confidence and triumphant joy. Three weeks afterward he visited Herrnhut, the centre of Moravian operations, where he listened to Christian David, had earnest conversations with Zinzendorf, and was confirmed in some of his religious opinions. He returned to England in September, and from this time forward was moved by an unconquerable zeal to declare a free salvation to all men through simple faith in the Lord Jesus Christ. Till December he preached constantly in the churches of London and vicinity, and in the prisons and almshouses. His sermons were not generally well received within the establishment, and there seemed little sympathy with his earnestness. On Whitefield's return to England in December of this year he found the churches closed against him. This led him to engage in open-air preaching at Bristol. In May, 1739, Wesley joined him there and began to preach to immense multitudes. After Whitefield had gone into Wales, Wesley, for the sake of more thorough instruction, began to gather the converts into "bands," and appoint times and places for prayer and counsel. On May 12 he laid in Bristol the corner stone of the first Methodist chapel, control of which, contrary to his own purpose, became vested in himself, as did that of all the other Wesleyan chapels built during his lifetime. In November he opened the foundery chapel in Moorfields, London, and this became the headquarters of the Methodist movement. Here was organized the first "society," consisting of eight or ten persons, "who came to Wesley and desired him to spend some time with them in prayer, and advise them how to flee from the wrath to come." From London as a centre he made long and frequent journeys, usually on horseback, preaching generally twice a day, and often four times on Sunday. During the year 1739 he began a series of publications for the exposition of his views, for the encouragement and instruction of the "societies," and for the defence of his course against his opponents. The doctrinal differences between himself and the Moravians had become more and more serious, and resulted in his formal and solemn separation from them in July, 1740. About the same time, also, Wesley published a sermon on "Free Grace," in which he strenuously opposed the doctrine of election and predestination. Whitefield while in America had embraced the Augustinian doctrine; and he had requested Wesley to refrain from the publication of his sermon, for the sake of the peace of the societies. The effects of it were the temporary alienation of Whitefield and Wesley, and the organization of the Lady Huntingdon Methodists and the Calvinistic Methodists in Wales. From this time there were two distinct movements: the Calvinistic, led on by George Whitefield, and the Arminian, by John Wesley. Wesley's work was now greatly enlarged. In spite of much opposition and ridicule, it became necessary to provide for the increasing evangelical labor, and for the more careful oversight and nurture of such as had been formed into "bands." In 1742 he first employed a lay ministry, although lay preaching had been practised several years by Cennick, Humphreys, and Nelson. His journeys were soon extended into Scotland, Wales, and Ireland. He seldom travelled less than 40 miles a day, generally on horseback; and for 50 years, it is said, there was not an instance of detention on account of the severity of the weather. He formed societies, employed lay preachers, appointed class leaders, devised a most effective system of church finance, wrote and published books and tracts, and established schools. In the neglected mining and manufacturing districts were witnessed the most wonderful effects of his preaching. The miners of Cornwall came together in thousands, and thousands were converted and reformed from the lowest vices. The first Methodist conference was assembled in the foundery chapel on June 25, 1744. Besides the two Wesleys, there were present four ordained ministers of the church of England and four lay preachers. It is evident that the design of Wesley up to this time was simply to effect a religious revival within the church of England, and save the neglected multitudes. During the year 1744 most bitter persecutions were suffered by the Methodists, especially in Staffordshire; and frequent attacks were made upon Wesley through the journals and by pamphlets. Under these circumstances he published his "Earnest Appeal to men of Reason and Religion," which consists largely of a defence of the opinions and practices of the Methodists, and soon afterward appeared his "Further Appeal." From the discussions of the conference of 1747 it is plain that his views of ecclesiastical polity and administration had undergone very considerable change. According to his own statement, this had been caused chiefly by reading Lord King's "Primitive Church." Nevertheless, he did not entertain the suggestion of separation from the church of England, but in 1758 published twelve reasons against it. These, however, are all based on the simple inexpediency, and not on the unlawfulness of such separation. On the death of Whitefield, the Calvinistic controversy broke forth with increased violence. This was the occasion of some of Wesley's most vigorous writings, and brought to his aid the powerful pen of Fletcher. From this time each branch went its own way to do its own work. In 1770 preachers had been sent to America. The zeal of some Irish Methodist emigrants in New York, of some earnest laborers in Maryland, and of these missionaries had been most successful, and had laid the foundations of a future church. On the establishment of the independence of the colonies, the Methodists in America called for the administration of the sacraments at the hands of their preachers. Since Wesley had for years been satisfied that the orders of bishop and presbyter in the primitive church were essentially the same, in 1784, with the assistance of others, he ordained Thomas Coke superintendent or bishop of the Methodist societies in America, and empowered him to confer the like office on Francis Asbury. (See METHODISM.) At the session of the conference of 1784 Wesley provided for the perpetuity of the work after his death by naming in a deed of declaration 100 preachers who should constitute a "legal conference," and who should hold in trust the chapels and other property, and have the general oversight of the affairs of the societies. The ordination of Coke and Asbury greatly offended Charles Wesley, and he denounced it as a schism. It also caused excitement and alarm among many officials of the establishment. Wesley justified the act both on the grounds of right and of expediency, and in 1786 he ordained six or seven other preachers, sending some to Scotland and others to foreign parts. Three years later he ordained Mather, Rankin, and Moore "to administer the sacraments of baptism and the Lord's supper according to the usages of the church of England." During the last four years of his life his strength had continued to decline, yet not his zeal or his labors. The same untiring energy which had characterized his life for more than 60 years was conspicuous to the closing week of his career. The last four days he spent in praising God, exclaiming at intervals: "He causeth his servants to lie down in peace;" "The Lord is with us, the God of Jacob is our refuge;" "The best of all is, God is with us." He was buried in the cemetery behind the City Road chapel. A monument to him and Charles Wesley in Westminster abbey was unveiled by Dean Stanley, March 30, 1876.—John Wesley's organizing power was extraordinary, his control over men most exceptional, and his diligence scarcely paralleled. His style in the pulpit was fluent, clear, argumentative, often amusing, well suited to the capacity of his hearers, but never impassioned like Whitefield's. He had a mild and grave countenance, which in old age appeared extremely venerable. His manners were polite and entirely free from gloom or austerity. He was married in 1752 to Mrs. Vizelle, a wealthy widow with four children. This union, which proved exceedingly unfortunate, was without issue. During the 65 years of his ministry he travelled about 270,000 miles, mostly on horseback, and delivered over 40,000 sermons, besides addresses, exhortations, and prayers. He was a voluminous writer, and his works, edited, translated, and original, cover a very wide range of topics, including theology, philosophy, history, poetry, polemics, experimental piety, &c., besides a "Journal" which was begun at Oxford and continued during almost his entire public career. A collection of his works appeared during his lifetime (32 vols. 12mo, 1771–'4), and another in 1809 (16 vols. 8vo). A thoroughly corrected edition, and the best, was prepared by Thomas Jackson, D. D., in 1831 (7 vols. 8vo, New York).—The life of Wesley has been written by Thomas Coke and Henry Moore, to whom all his manuscripts were left (8vo, 1792), Whitehead (1793–'6), Robert Southey (2 vols. 8vo, 1820; best ed., with notes by D. Curry, D. D., 2 vols. 12mo, New York, 1847), Moore (1824), Richard Watson (1831), and L. Tyerman (3 vols. 8vo, New York, 1870; 3d ed., 1876). In this last the author, in his endeavor to give the latest results and to be impartial, has possibly given too much prominence to foibles, and brought to public view what just biography permits to be kindly veiled. See also Isaac Taylor, "Wesley and Methodism" (1851); Abel Stevens, "History of the Religious Movement of the Eighteenth Century called Methodism" (3 vols. 12mo, New York, 1859–'62); and L. Tyerman, "The Oxford Methodists" (1873).

IV. Charles, an English clergyman, brother of the preceding, born at Epworth, Dec. 18, 1708, died in London, March 29, 1788. He was educated at Westminster school and at Oxford. When John went as a missionary to Georgia, Charles accompanied him, in the capacity of secretary to the governor of the colony. When they arrived in America Charles went to Frederica. Failing to carry out his strict views of Christian discipline, he returned to Savannah, and then went to Charleston, whence he sailed for Europe. He preached for a while to large congregations at Blackheath, near London, and after the return of his brother from Georgia entered upon the itinerant ministry. After his marriage in 1749 he confined his labors mostly to London and its vicinity. A volume of his sermons, his journal, and two volumes of his hymns, which possess extraordinary merit, have been published. He left two sons, Charles and Samuel, who were remarkable musicians.—See Stevenson's "Memorials of the Wesley Family" (London, 1876), which includes historical biographies of its leading members for nearly 250 years.

WESLEYAN UNIVERSITY, an institution of learning in Middletown, Conn., and the oldest college under the control and patronage of the Methodist Episcopal church. The two original buildings, which previously to 1829 were occupied as a military academy, were given to the trustees of the college on condition of their raising an endowment of $40,000. Besides these there are now Rich hall, the gift of Isaac Rich, for a library building; memorial chapel, built from the contributions of the church in the centenary year of American Methodism (1866); Judd hall, the gift of Orange Judd; and observatory hall, which has a refracting telescope of 12-inch aperture, made by Alvan Clark and sons. The five principal buildings have a common front line upon an ample campus, and command an extended and magnificent view of the Connecticut river and valley. Observatory hall and the gymnasium are just in the rear of the main buildings. The estimated value of the grounds and buildings is $400,000. The library has more than 26,000 volumes, and is annually increased from the income of the alumni library fund of over $20,000. Judd hall contains the well furnished chemical laboratory and the large museum of natural history. The income of the institution from all sources for the collegiate year 1874–'5 was $47,000. Tuition is practically free, but this is due to a system of scholarships which will soon expire by the terms of their limitation.—The college was organized in 1830, chartered in May, 1831, and opened in the following September. Wilbur Fisk, D. D., was the first president and the leading mind in the organization of the institution, and remained in office till his death in 1839. Under his administration the proficiency of the student in each department separately was the only basis of classification, and upon satisfactory examination diplomas were bestowed irrespective of the time spent in college. This was soon abandoned, and the class system adopted. At this time the college was among the earliest to adopt the plan, now generally approved, of providing a scientific in addition to the ordinary classical course. Nathan Bangs, D. D., was elected president in 1841, and resigned in 1842. His successor, Stephen Olin, D. D., gave a great impulse to the financial affairs and widely extended the reputation of the institution. During the presidency of Augustus W. Smith, LL.D. (1852–'7), a fund of $100,000 was pledged to increase the endowment. Under the administration of President Joseph Cummings, D. D., LL. D. (1857–'75), the material facilities were extended, and great improvements were made in the course of study. The present incumbent (1876), Cyrus D. Foss, D. D., was elected in July, 1875. The president is *ex officio* a member of the corporation, or board of trustees, whose number by the charter cannot exceed 40, each patronizing conference appointing one trustee, elected by ballot at a regular session. The present number of patronizing conferences (1876) is thirteen, six in New England, five in New York, one in New Jersey, and one in Pennsylvania. Alumni of

Wesleyan University.

three years' standing may elect five trustees, and the rest are elected at large by the board itself. The board is divided into five classes, one of which retires annually. The powers of the corporation cover all matters of external or internal management.—In the university there are three courses of four years each. The classical course is substantially the same as in other New England colleges. The Latin-scientific and scientific courses are designed especially for advanced culture in the sciences and in modern languages and literature. In all these courses, about half the work of the last two years consists of elective studies. Special and post-graduate courses are also provided. The extensive laboratories of the college are now used also for such chemical investigations as belong appropriately to the state agricultural experiment station recently established here. A chemist paid by the state devotes himself to this work. Since 1872 the university courses have been open to both sexes. The whole number of alumni in 1875 was 1,107, of whom 174 have died. Accord-to the "Alumni Record" published in 1873, of 1,028 then graduated, 503 had been in the ministry, chiefly in the Methodist Episcopal church; 271 became professional teachers, of whom 43 were presidents of colleges; and in the professions of law and medicine there were 269. In 1875–'6 the faculty consisted of the president, nine professors, three instructors, a curator of the museum, and two assistants in the scientific department. The number of students was 176, of whom 9 were females.

WESLEYAN UNIVERSITY, Ohio, an institution of learning at Delaware, Delaware co., Ohio. In 1842 the citizens of Delaware purchased the property known as the Sulphur Springs, a watering place of some note, and offered it to the Ohio and North Ohio conferences of the Methodist Episcopal church as a site for a college. In 1843 a charter was granted with full university powers, and in 1844 a faculty was partially organized, and students were admitted into both the preparatory department and college classes. The college grounds are very beautiful, and contain more than 800 varieties of trees and shrubs. The institution has libraries containing more than 13,000 volumes and extensive cabinets of natural history. The endowment fund is about $250,000. A large number of cheap scholarships have been sold, so that practically tuition is nearly free. A students' loan fund affords aid to indigent young men preparing for the ministry. In 1875–'6 there were 10 instructors and 200 preparatory and 163 collegiate students. The whole number of classical graduates is (1876) 623. The presidents have been as follows: the Rev. Edward Thomson, 1846–'60; the Rev. Frederick Merrick, 1860–'73; the Rev. Lorenzo D. McCabe (acting), 1873–'6; and the Rev. Charles H. Payne, inaugurated in June, 1876.

WESSEL, John, also called **Gansfort** (Dutch, GOESEVORT), a theologian classed among the "reformers before the reformation," born in Groningen about 1420, died Oct. 4, 1489. He was successively a resident of Cologne, Louvain, Paris, and Heidelberg, engaged in study or teaching, finally living in retirement in his native country. He regarded Christianity as something entirely spiritual. The Scriptures, in his view, are the living source of all true faith, and the church is based upon a compact. After his death some of his works were burned as heretical; his *Farrago Rerum Theologicarum* was published with a preface by Luther (Wittenberg, 1522). The best edition of his works is by Lydius (Amsterdam, 1617).

WESSEX (that is, West Saxony), a kingdom of the Saxon heptarchy in England during the 6th, 7th, and 8th centuries. It was founded about 500 by Cerdic, under whom it comprised the present counties of Southampton (including the Isle of Wight), Dorset, Wilts, and Berks. One of its sovereigns, Egbert, obtained an acknowledgment of superiority from the other kingdoms about 827, and is usually called the first king of England.

WEST, Benjamin, an Anglo-American painter, born of Quaker parents in Springfield, Pa., Oct. 10, 1738, died in London, March 11, 1820. He began to make colored drawings from nature in his seventh year, and in his ninth composed a picture which 67 years afterward he asserted contained touches never surpassed by him. He received elementary instructions in Philadelphia, and practised his art in that city and the neighboring towns, and afterward in New York, chiefly as a portrait painter. In 1760 he went to Italy, where his portrait of Lord Grantham, at first generally attributed to Raphael Mengs, attracted considerable attention. He visited the chief Italian art capitals, and at Rome painted "Cimon and Iphigenia" and "Angelica and Medora," which were well received. In 1763 he went to London on his way to America, but was induced to take up his residence in that city, where in 1765 he married Elizabeth Shewell, a young American woman to whom he had been previously attached, and who joined him in England at his request. A successful picture representing Agrippina landing with the ashes of Germanicus was the means of introducing him to George III., for whom he painted the "Departure of Regulus," and who for nearly 40 years was his friend and patron. During a career of almost unvarying prosperity, he painted or sketched about 400 pictures, many of which are of great size, besides leaving upward of 200 drawings at his death. One of his early pictures, the "Death of Wolfe," widely known through the fine engraving of Woollett, may be said to have created an era in the history of British art, from the fact that the figures were habited in the costume appropriate to their time and character. The experiment of substituting modern for classical costumes was considered hazardous, and Sir Joshua Reynolds and others endeavored to dissuade the painter from it; but he persevered, and Reynolds was one of the first to congratulate him on his success. He painted for George III. a number of subjects taken from early English history, and projected a grand series of works illustrating the progress of revealed religion for the chapel at Windsor castle, of which 28 were executed. After the superannuation of the king the commission was cancelled. He then began a new series of religious pieces. The first, "Christ Healing the Sick," was intended as a present to the Pennsylvania hospital in Philadelphia; but it was purchased for £3,000 by the British institute, and a copy with some alterations was sent by West to Philadelphia. The most remarkable picture of this series was "Death on the Pale Horse," from Revelation, exhibited in London in 1817. Among his battle pieces was the "Battle of La Hogue," one of his best pictures. In 1792 he succeeded Sir Joshua Reynolds as president of the royal academy, declining the honor of knighthood. He retired from that post in 1802, but was reëlected a year later, and retained the office until his death. The extraordinary reputation once enjoyed by West was largely due to the facility with which he worked, and to the academic correctness of his designs. His pictures are chiefly remarkable for composition, the coloring being of a uniform reddish brown tint, in no respect resembling nature. Few artists have shown so little individuality and such an equality of merit. Many of his works have been engraved by Woollett, Sharpe, Hall, Heath, and others.

WEST, Stephen, an American clergyman, born in Tolland, Conn., Nov. 13, 1735, died in Stockbridge, Mass., May 15, 1819. He graduated at Yale college in 1755, and studied theology, became chaplain at Hoosick fort in 1757, succeeded Jonathan Edwards in the Indian mission at Stockbridge in 1758, and was ordained as pastor of the Congregational church there in 1759. About 1770 he resigned his charge of the Indians, and adopted the Hopkinsian theology. He published "An Essay on Moral Agency" (12mo, 1772; enlarged ed., 1794); "Duty and Obligation of Christians to marry only in the Lord" (1779); "An Essay on the Scripture Doctrine of the Atonement" (1785); "An Inquiry into the Ground and Import of Infant Baptism" (1794); "Life of Rev. Samuel Hopkins, D. D." (1806); and "Evidence of the Divinity of the Lord Jesus Christ collected from the Scriptures" (1816).

WESTALL. I. Richard, an English painter, born in Hertford in 1765, died Dec. 4, 1836. He served an apprenticeship to an engraver, but took up painting and designing, and executed water-color drawings chiefly on subjects from classical mythology. He furnished some of the designs for Boydell's "Shakespeare Gallery." He lost largely by speculations in pictures. He was elected a royal academician in 1794. **II. William,** brother of the preceding, born in Hertford, Oct. 12, 1781, died Jan. 22, 1850. He was educated in the school of the royal academy, and in 1801 accompanied Capt. Flinders in his voyage of discovery, in the course of which he visited Australia, China, and India, made a large number of sketches, and painted some elaborate views of the coasts and interior of Australia. He published several volumes of views in England and the East.

WEST BATON ROUGE, a S. E. parish of Louisiana, bounded E. by the Mississippi river and W. by Bayou Fordoche; area, about 225 sq. m.; pop. in 1870, 5,114, of whom 3,404 were colored; in 1875, 5,742, of whom 3,996 were colored. The surface is low, and much of it subject to inundation; the soil is fertile. It is traversed by the Baton Rouge, Grosse Tête, and Opelousas railroad. The chief productions in 1870 were 24,955 bushels of Indian corn, 2,445 bales of cotton, 806 hogsheads of sugar, and 50,740 gallons of molasses. There were 379 horses, 753 mules and asses, 1,231 cattle, and 280 swine. Capital, Allain.

WEST BRIDGEWATER. See BRIDGEWATER.

WESTCHESTER, a S. E. county of New York, bordering on Connecticut and Long Island sound, bounded W. by the Hudson river, and drained by the Croton and Bronx rivers; area, about 500 sq. m.; pop. in 1870, 131,348. By an act of 1873 a portion of the S. part was annexed to New York city, and in 1875 the population of the county was 100,660. Several ridges of hills extend N. and S. through the county. Stock growing, gardening, and fruit raising are among the chief occupations. Extensive quarries of marble are found near Sing Sing, and there are several mineral springs. It is traversed by the Hudson River, the Harlem, and the New York and New Haven railroads. The chief productions in 1870 were 23,757 bushels of wheat, 31,457 of rye, 263,211 of Indian corn, 196,846 of oats, 425,626 of potatoes, 430,737 lbs. of butter, 6,479 of wool, and 66,551 tons of hay. There were on farms 5,828 horses, 17,321 milch cows, 5,904 other cattle, 2,391 sheep, and 6,383 swine. The whole number of manufactories was 567, having an aggregate capital of $8,464,058; value of products, $15,828,372. The most important were 8 of agricultural implements, 10 of boots and shoes, 29 of bricks, 1 of carpets, 33 of carriages and wagons, 14 of clothing, 2 of cotton goods, 2 of cutlery and edge tools, 3 of files, 17 of furniture, 3 of hats and caps, 1 of India-rubber and elastic goods, 17 of iron, forged, cast, &c., 4 of lime, 5 of machinery, 1 of molasses and sugar refined, 3 of preserves and sauces, 20 of saddlery and harness, 17 of sash, doors, and blinds, 1 of sewing machines, 1 bleaching and dyeing establishment, 5 flour mills, 19 breweries, 3 planing mills, and 7 saw mills. Capital, White Plains.

WEST CHESTER, a borough and the county seat of Chester co., Pennsylvania, situated on the dividing ridge between Brandywine and Chester creeks, 23 m. W. of Philadelphia; pop. in 1870, 5,630. It is surrounded by one of the finest agricultural regions in the Union, has a handsome granite court house, 110 ft. long by 60 ft. wide, and is noted for its elegant public and private buildings. The bank of Chester county is of white marble, a copy of the Doric portico in the market place at Athens. The Episcopal church is in the English Gothic style, built of green serpentine. The houses are built principally of brick, and as well as the streets are lighted with gas. Two railroads connect the place with Philadelphia. It contains two manufactories of agricultural implements, extensive spoke and wheel works with a European reputation, a state normal school, 11 other schools, a cabinet of natural sciences founded in 1826, two public libraries, the agricultural grounds and buildings of Chester co., three newspaper offices publishing a daily, a semi-weekly, and two weekly newspapers, and 10 churches, viz.: 3 Baptist, 1 Episcopal, 2 Friends', 2 Methodist, 1 Presbyterian, and 1 Roman Catholic. It was established as the county seat in 1786.

WESTCOTT, Brooke Foss, an English clergyman, born near Birmingham in January, 1825. He graduated at Cambridge in 1848, took orders in 1851, and became assistant master in Harrow school in 1852, examining chaplain to the bishop of Peterborough in 1868, a canon of the cathedral in 1869, and regius professor of divinity at Cambridge in 1870. His publications include "Elements of the Gospel Harmony" (1851); "History of the Canon of the New Testament during the first four Centuries" (1855; 4th ed., 1875); "Characteristics of the Gospel Miracles," sermons before the university of Cambridge (1859); "Introduction to the Study of the Gospels" (1860; 4th ed., 1872); "The Bible in the Church, a Popular Account of the Collection and Reception of the Holy Scriptures in the Christian Churches" (1864; 3d ed., 1872); "The Gospel of the Resurrection, Thoughts on its relation to Reason and History" (1866; 3d ed., 1874); "A General View of the History of the English Bible" (1868); and "The Christian Life Manifold and One," six sermons (1870).

WESTERBOTTEN, a N. län of Sweden, in Norrland, bordering on Norway and the gulf of Bothnia; area, 23,865 sq. m.; pop. in 1874, 96,084, including many Lapps. It is traversed by branches of the Kiölen mountain chain, and includes Lakes Stor, Stor Uman, and Horn Afvan. It is drained by the Umea and its branch the Windel, the Pitea, and other rivers, most of them forming cataracts and rapids. The heat in summer is oppressive. Agriculture is limited. Forests abound, and the principal trade is in timber. Iron, lead, and copper are produced. Fish are plentiful, especially salmon. The province is famous for its furs and game, particularly reindeer, and it is a favorite resort of sportsmen. Capital, Umea.

WESTERN AUSTRALIA, a British colony in Australia, comprising all of the continent W. of lon. 129° E.; area estimated at 978,000 sq. m.; pop. in 1871, exclusive of aborigines, 24,785; estimated in 1875, 27,371. The coast, which is mostly flat, is about 3,000 m. long, and is indented by many bays and fringed with numerous small islands and coral reefs, inside of which is good anchorage. The principal inlets are Cambridge gulf, Admiralty gulf, York sound, Brunswick bay, Collier bay, King sound, Roebuck bay, Exmouth gulf, Shark bay, Geographe bay, Flinders bay, Tor bay, and King George's sound. The surface is mostly level and undulating, and is in great part covered with forests. The principal mountains are the Victoria, Herschel, and Darling ranges, which run parallel to the W. coast, at distances varying from 10 to 25 m. from it, and seldom exceed 2,000 ft. in height. Mt. William in Murray county, 3,600 ft. high, is one of the highes peaks in the colony. The chief rivers on the N. W. coast are the Glenelg, Fitzroy, De Gray, Sherlock, Fortescue, and Ashburton; on the S. W., the Gascoyne, Murchison, Irwin, Arrowsmith, Moore, Swan, Murray, and Collie; and on the S., the Blackwood, Frankland, Kalgan, and Pallinup. The Swan, with its affluents, the Canning, Avon, and others, drains several of the most important counties, and empties into a bay called Melville water, in lat. 32°. On its estuary are situated Perth, the capital of the colony, and Fremantle, the principal port. There are no large lakes, but many shallow lagoons, most of which are salt. The largest are Austin, Moore, Great Salt, and Barlee. The W. coast has a sandy soil composed chiefly of the detritus of old coral reefs; inland is found a conglomerate of disintegrated granite stained with iron, and called ironstone, among which are granite, slate, quartz, trap, and pipe clay. Vast plains of sand, covered with spinifex and scrubby timber, but with no grass nor watercourses, are found in the interior; but there is much land suitable for sheep grazing and agriculture. The flora and fauna are similar to those of the other Australian colonies. Flowers, fruits, and vegetables from all parts of the world are easily acclimated, and deer, Angora goats, hares, and trout have been introduced. The mineral riches are very great, silver, lead, copper, iron, and plumbago being found in many places. In 1873-'4 valuable auriferous quartz lodes were discovered, and there are indications of coal and petroleum. The climate is very salubrious; in the southern part it resembles that of England, in the middle that of S. Italy, and in the north, though hot, it is generally dry and tempered with cool breezes. Severe droughts and heavy floods are unknown. Snow is never seen, and ice but seldom. The principal industries are agriculture and stock raising. In 1874 there were 45,292 acres in crops, of which 23,427 were in wheat. Wine and silk are produced to some extent, the cocoanut is raised on the N. W. coast, and sugar cane has been introduced from Mauritius. Cotton thrives, but coffee is a failure. The live stock consisted in 1874 of 26,637 horses, 46,748 horned cattle, 777,861 sheep, and 13,290 swine. Large quantities of sandal wood and jarrah, or W. Australia mahogany, are annually cut and exported. The exports of sandal wood in 1874 amounted in value to £70,580. The pearl fishery on the N. W. coast is increasing in value yearly. In 1874 a fleet of 54 schooners and cutters and 135 small boats were engaged in it, and the estimated value of the pearls and pearl shells obtained was £74,162. The chief seats of the fishery are Port Cossack and Shark's bay. Malays are employed as divers. The colony has an Anglican and a Roman Catholic bishop, both of whom reside at Perth. The settled portion of Western Australia, a district nearly as large as France, is divided into 25 counties. The administration is in the hands of a governor appointed by the crown, who is assisted by an executive council. In 1875 steps were taken for the establishment of a constitutional government. The total revenue for 1874 was £148,072, and the expenditure £143,266. The public debt in 1874 was £35,000, which has since been increased by a loan of £100,000, for the construction of a railway and telegraphs. The total value of imports during 1874 was £364,262; of exports, £428,836. The total shipment of wool was 2,874,982 lbs., valued at £215,624. In the same year 144 vessels, of 65,351 aggregate tonnage, entered the ports. Steam communication has been established between the chief ports on the W. coast and Albany in King George's sound, where the mail steamers for Europe and the eastern colonies call.—Western Australia was first taken possession of in 1826. In 1829 a settlement was made at Swan river, but the colony made little progress until after 1850, when convict labor was introduced. The transportation ceased in 1868, up to which time nearly 10,000 prisoners had been absorbed. During this period the colony made great material progress. In 1874 there were remaining 1,162 male convicts, 430 of whom were in confinement.

WESTERN EMPIRE, the name given to the western of the two parts into which the Roman empire was divided on the death of Theodosius the Great, A. D. 395. By the will of that emperor the eastern portion, now known as the Byzantine empire, was given to his elder son Arcadius. (See BYZANTINE EMPIRE.) The western portion, with Rome as its capital, was bequeathed to his younger son Honorius, then in his 11th year. His dominion extended over Italy, the islands of the western half of the Mediterranean, the province of Africa, Mauritania, Gaul, Spain, Britain, Rhætia, Noricum, Pannonia, and Dalmatia. Yet it was intended by Theodosius that the two vast empires should be ruled in common by the two brothers. The guardian of Honorius was Stilicho, the master general of the forces. (See STILICHO.) The Visigoths, under the lead of Alaric, in 395 invaded the rich provinces of Thrace and Macedonia, and ravaged almost all Greece; and in 396 Stilicho marched at the head of the forces of the western empire to the Peloponnesus with the design of destroying the barbarian army. But the jealousy of the Byzantine court led it to order Stilicho out of Arcadius's dominions, and make Alaric master general of eastern Illyricum. In 402 he invaded Italy, but in the spring of 403 was defeated with great slaughter by Stilicho at Pollentia and Verona. In 405 Radagaisus, at the head of a mixed horde of Goths, Vandals, Suevi, Burgundians, and Alans, crossed the Alps, pillaged and destroyed many cities, and besieged Florence, where the army of Stilicho forced them to surrender. Radagaisus was put to death, and most of his surviving troops were sold as slaves. In 407 a private soldier named Constantine, who had been placed at the head of the army in Britain by the mutinous troops, crossed the channel to effect the conquest of the western empire. The imperial army was ignominiously defeated at Vienna in Gaul, and forced to recross the Alps. This success was soon followed by the conquest of Spain under the usurper's son Constans. In the mean time Alaric after his retreat from Italy had left the service of the eastern empire and gone over to that of the western, being created master general of western Illyricum, which then embraced Noricum, Pannonia, and Dalmatia. In the negotiations which were carried on, Stilicho, who knew the weakness of the empire, advised compliance with the extravagant demands of the Gothic king, and the senate consented to pay a subsidy of 4,000 pounds of gold. By the death of Stilicho, who was put to death in 408, the western empire lost its only military leader capable of withstanding the Goths. Alaric, after carrying on an artful negotiation with the Roman court, suddenly crossed the Alps and the Po in 408, ravaged all northern Italy, and encamped under the very walls of Rome; but he raised the siege on receiving 5,000 pounds of gold and 30,000 pounds of silver, besides an immense amount of silk and scarlet cloth and spices. Fixing his winter quarters in Etruria, Alaric renewed negotiations with the Roman court, which acted with its customary treachery and weakness. At last, indignant at repeated insults, he took Rome (409), and gave it a new emperor in the person of Attalus, the prefect of the city, who in turn appointed the Gothic chieftain master general of the western empire. Nearly all Italy submitted to the new monarch, whom Alaric led to the gates of Ravenna, the capital of Honorius. The latter, without resources and surrounded by treachery, offered to divide the sovereignty with Attalus. Alaric disdainfully rejected the offer, and demanded for his creature the whole authority. Honorius was on the point of flying to the protection of his nephew Theodosius II., emperor of the East, when 4,000 veterans unexpectedly landed at Ravenna. The troops of Attalus had been defeated in Africa by Count Heraclian, divisions had arisen in consequence, and Alaric publicly deprived the new emperor of all semblance of sovereignty. The Gothic king opened negotiations once more with the court of Ravenna; but with returning fortune the insolence of the imbecile government returned. A herald announced that the guilt of Alaric had for ever shut him out from the friendship and alliance of Honorius, and Alaric for the third time began his march to Rome. The city was taken by treachery on the night of Aug. 24, 410, and given up to the fury of his warriors, who pillaged private houses, burned a large number of the dwellings, and carried off many works of art; but by a special decree of Alaric the churches and the treasures contained in them were left untouched. After six days of spoliation the Goths took up their line of march along the Appian way to southern Italy, plundering the country and capturing the cities as they went. They were on the point of crossing the straits of Messina into Sicily, when the sudden death of their leader put an end to their design. Alaric was succeeded by his brother Ataulphus, who as a Roman general marched in 412 to southern Gaul, which he soon conquered as far as the ocean. In 409 Constantine, who had usurped the dominion of Gaul and Spain, had made a treaty with Honorius to drive the Goths from Italy, and for this purpose he conducted an army as far as the Po. During his absence, his general Gerontius, commanding in Spain, revolted, set up Maximus as emperor, crossed the Pyrenees, defeated and slew Constans, and besieged Constantine at Arles, whither he had hastily returned. The place was about to surrender when the approach of the army of Honorius under Constantius scattered the forces of Gerontius, who fled and was killed. Constantius then took Arles and sent Constantine to Honorius, who put him to death. Jovinus, who had assumed the title of emperor in Gaul, marched to the Rhône with a large body of barbarians, and Constantius gave up Gaul without a battle. Jovinus was afterward defeated and slain by Ataulphus, who was compelled by Constantius to withdraw into Spain, where he was assassinated in 415. Wallia, the next king of the Goths, entered the service of the Romans, and subdued the Vandals, Suevi, and other tribes who had ravaged Spain. In 418 the Goths received from Honorius southwestern Gaul, with Toulouse for the capital, as a kind of feudal dependency of the empire. The Burgundians and Franks also occupied permanent seats in Gaul, and the British asserted their independence. In 421 Constantius, who had married Placidia, daughter of Theodosius the Great, was raised to a share in the government, but he died shortly after, and Placidia fled in 423 to the court of Theodosius II. In the same year Honorius died. The throne was usurped by his principal secretary Joannes till 425, when Valentinian III., a boy of six years, received the imperial purple. Placidia, as guardian for her son, was the real sovereign. Aëtius, the former general of Joannes, was raised to the dignity of *comes*. By intrigue he led Count Boniface, then commanding in Africa, to revolt, and the latter in 429 called in to his aid the Vandals, who under Genseric overthrew the Roman power and established the Vandal empire in Africa. A war broke out in southern Gaul, where the Goths under their king Theodoric defeated and made prisoner the Roman general. The extreme cities and provinces began gradually to drop off from the western empire; Sicily was ravaged by Genseric in 440; in 446 Britain was entirely abandoned by the Roman forces; and in 451 Attila, king of the Huns, marched into Gaul, and began the siege of Orleans. The city was almost on the point of surrendering, when the Roman and Gothic army under Aëtius and Theodoric advanced to its rescue. Attila crossed the Seine, and was defeated in a terrible battle on the plains of Châlons. In 455 Valentinian was assassinated. He was succeeded by Petronius Maximus, the unanimous choice of the senate and the people. The new emperor forced Eudoxia, the widow of Valentinian, to become his bride, though acknowledging to her his agency in the murder of Valentinian, and she secretly implored the aid of Genseric, king of the Vandals, whose fleets had already ravaged the coasts of Italy. At the head of an army Genseric landed at the mouth of the Tiber. Maximus in an attempt to flee was slain in a tumult at Rome, after a reign of three months. Three days afterward the Vandals marched upon the city, and for 14 days and nights the pillage went on. All the wealth and treasure that had been left by the Goths, together with a large number of captives, including the empress and her two daughters, were carried off. Avitus, an illustrious Roman, now ascended the imperial throne, but was soon displaced by Count Ricimer, one of the leaders of the barbarian troops defending Italy. In 457 Ricimer consented to the accession of Majorian, the ablest and best of the later Roman emperors. Majorian granted release from all arrears of tribute and public debt, restored the jurisdiction of the provincial magistrates whose functions had been superseded in great measure by extraordinary commissions, compelled the municipal corporations to resume their duty of levying the tribute, revived the office of defenders of cities to protect the lower classes against the higher, and checked by severe laws the destruction of the public buildings in Rome. Nor was he less able and successful in his foreign policy. Vast numbers of barbarians, attracted by his fame, flocked to his standard from all quarters, and he reduced Gaul to obedience, defeating the Visigoths under Theodoric, whom he admitted to an alliance. Spain, which during the reign of Avitus had been overrun by the Goths, submitted to his authority. He undertook to restore Africa to the empire, but by treachery Genseric was enabled to destroy the immense fleet of Majorian in the bay of Cartagena. He immediately applied for peace, however, and the emperor consented to a treaty. Count Ricimer, who found that he had raised a master instead of a servant to the throne, persuaded the inconstant soldiers to engage in a sedition, through which Majorian was obliged to abdicate on Aug. 2, 461, while at his camp near Tortona. Five days afterward he died or was put to death, and the Roman senate immediately obeyed the demand of Ricimer and conferred the imperial title upon Libius Severus. Of the events of his reign, which lasted until August, 465, there is scarcely any record. The government was entirely in the hands of Count Ricimer, who after the death of Severus made no effort to have any successor placed upon the throne, but negotiated alliances, amassed treasures, and formed a separate army, as if he were emperor. His authority, however, did not extend beyond Italy. Meanwhile the Vandals continued their depredations on the Italian coasts. In one of their expeditions they subdued the island of Sardinia. Ricimer humbly solicited the aid of Leo, emperor of the East. That monarch determined to destroy the Vandal power, and placed upon the throne of the West Anthemius, one of his most distinguished subjects, who was inaugurated in Rome in 467. The daughter of Anthemius was married to Ricimer, and all the powers of the West and East were assembled to destroy the Vandal authority. A fleet of 1,113 ships, carrying over 100,000 men, sailed from Constantinople to Carthage, and the entire armament was put under the command of Basiliscus, the brother-in-law of Leo. Landing his troops at Cape Bona, he was either joined or aided by the army under Heraclius, which had already subdued Africa Syrtica (Tripoli), and the fleet under Marcellinus advancing from Sardinia, and began his march toward Carthage. But the wily Genseric, having obtained a truce of five days, attacked by night the unguarded imperial fleet, and routed his enemies. He soon regained all lost ground, and added Sicily to his dominions. In the mean while Theodoric II., king of the Visigoths, and his successor Euric, had brought nearly the whole of Spain and Gaul under Gothic rule. The feeble government of Anthemius was finally overthrown by Ricimer in 472, who then proclaimed Olybrius emperor. Anthemius was killed by order of Ricimer, who died himself 40 days afterward, leaving the command of his army to his nephew Gundobald, prince of the Burgundians. The death of Olybrius followed on Oct. 23. Gundobald persuaded Glycerius, an obscure soldier, to accept the phantom sovereignty, and he was accordingly elevated to the throne in March, 473, at Ravenna. But his title was not acknowledged by the emperor of the East, who conferred the imperial dignity upon Julius Nepos, the nephew of Marcellinus and governor of Dalmatia. He immediately marched against Glycerius, who, unsupported by the Burgundian prince, was overthrown. In 475 the general of the barbarian confederates, Orestes, raised the standard of revolt, and deposed Nepos. Orestes declined the title of emperor, but consented that his son Romulus Augustus, whose name the Latins contemptuously changed into the diminutive Augustulus, should be invested with the purple. Orestes, in whom the real sovereignty lay, refused the demand of his barbarian allies that a third part of the lands of Italy should be divided among them; whereupon Odoacer, their leader, in 476 revolted, stormed Pavia, in which Orestes had taken refuge, and deposed Augustulus. The barbarian general determined to destroy the name as well as the power of the emperor of the West, and at his wish the Roman senate sent to the emperor Zeno an epistle in which they consented that the seat of universal empire should be transferred from Rome to Constantinople. They also requested that the emperor would invest Odoacer with the title of patrician, and charge him with the civil and military administration of the diocese of Italy. Thus fell the western empire, after existing separately from the eastern 81 years, during which it had been ruled over by 12 emperors, besides many usurpers in the provinces.

WESTER NORRLAND, or Hernösand, an E. central län of Sweden, bordering on the gulf of Bothnia; area, 9,515 sq. m.; pop. in 1874, 143,614. It is watered by numerous lakes and the rivers Angerman, Adals, and Indals. Capital, Hernösand.

WESTERWALD, a mountain range of Germany, in Prussian territory, lying E. of the Rhine, bounded N. by the Sieg and E. and S. by the Lahn. It consists of a lofty plateau from which rise numerous moderate elevations, the highest of which, the Saalberg, reaches a height of about 2,500 ft. The N. E. and central parts of the range, known also as Hoher Westerwald or Kalte Eich, are the highest. The rounded eminences frequently enclose a lake or marsh, and the large number of these renders the climate harsh and unfavorable to agriculture. Forests appear only upon the lower slopes and toward the Rhine. The winters are long and severe, and the snows heavy. The products are potatoes, oats, barley, flax, and hay. Some copper and iron are found, and there are considerable deposits of lignite and potters' clay. At and near Ramsbach large quantities of earthenware are manufactured, known in commerce as Coblentz ware. Malachite has lately been discovered.

WEST FELICIANA, a S. E. parish of Louisiana, bounded N. by Mississippi, E. by Thompson's creek, and S. and W. by the Mississippi river; area, about 350 sq. m.; pop. in 1870, 10,499, of whom 8,915 were colored; in 1875, 12,156, of whom 10,058 were colored. The surface is undulating, and the soil fertile. It is traversed by the West Feliciana railroad. The chief productions in 1870 were 66,029 bushels of Indian corn, 10,200 of sweet potatoes, 7,967 bales of cotton, 290 hogsheads of sugar, and 29,500 gallons of molasses. There were 671 horses, 940 mules and asses, 1,013 milch cows, 1,684 other cattle, 1,152 sheep, and 894 swine. Capital, St. Francisville.

WEST INDIES, the name given to the vast archipelago of about 1,000 islands between North and South America, extending in two irregular lines, which unite at Hayti, from the peninsulas of Yucatan and Florida to the mouth of the Orinoco. They enclose the Caribbean sea, dividing it from the gulf of Mexico and from the Atlantic ocean. They lie between lat. 10° and 28° N. and lon. 59° and 85° W., and are divided into four groups: 1, the Bahamas, about 600 in number, low flat islands of coral formation, S. E. of Florida, and extending toward Hayti (see BAHAMAS); 2, the Greater Antilles, between the Bahamas and Central America, comprising the four great islands of Cuba, Hayti or Santo Domingo, Jamaica, and Porto Rico, with a few neighboring small ones; 3, the Lesser Antilles or Caribbean islands, extending in a semicircular line from Porto Rico to the mouth of the Orinoco, and by some geographers also called collectively Windward islands, but by others, as well as the English government, divided into Leeward and Windward islands, respectively N. and S. of lat. 15°; and 4, the group off the coast of Venezuela (the Leeward islands of the Spanish explorers), embracing Margarita, Tortuga, Buen Ayre, Curaçoa, and several smaller islands. The following table exhibits the area, population, &c., of the larger islands and groups, according to the latest authorities:

ISLANDS.	TO WHOM BELONGING.	Area, sq. m.	Population.	CAPITALS.	Pop. of capital.
Hayti, Hispaniola, or Santo Domingo...	Hayti, the W. part, an independ. republic	10,204	572,000	Port-au-Prince..............	21,000
	Santo Domingo, or Dominican republic, the E. part, an independ. republic	18,000	136,500	Santo Domingo	6,000
Cuba, Porto Rico, isle of Pines, and dependencies..........................	Spain.................	47,278	2,184,438	Havana (Cuba).............. San Juan (Porto Rico).......	200,000 20,000
The Bahamas, Jamaica, and most of the Lesser Antilles (Trinidad, Tobago, Grenada, Barbadoes, St. Vincent, St. Lucia, Dominica, Montserrat, Antigua, St. Christopher, Barbuda, Anguilla, most of the Virgin islands, &c.)......	Great Britain.........	13,754	1,063,886	Kingston (Jamaica) .... Nassau (New Providence).... Port of Spain (Trinidad).....	35,000 9,000 7,000
Guadeloupe, Désirade, Martinique, Marie Galante, Les Saintes, N. part of St. Martin's, all in the Lesser Antilles....	France................	1,094	316,457	Basse-Terre (Guadeloupe).. Port Royal (Martinique).....	13,000 11,300
Curaçoa, Buen Ayre, Oruba, Los Roques (off Venezuela); St. Eustatius, Saba, and S. part of St. Martin's (Lesser Antilles)...........................	Netherlands	435	36,871	Willemstad, or Curaçoa (Curaçoa)	......
St. John's, St. Thomas, and Santa Cruz (Virgin islands).....................	Denmark.............	138	37,700	Christiansted (Santa Cruz)... Charlotte Amalie (St. Thomas)	6,000 11,330
St. Bartholomew (Lesser Antilles)......	Sweden...............	8	2,900	Gustavia........	900
Margarita, Tortuga, &c. (off Venezuela).	Venezuela	442	30,983	Assumption (Margarita).....	2,758
Total....................................	....	95,929	4,381,735		

The surface of the islands is very diversified. The Bahamas are low, flat, and of coralline formation. The Antilles, Greater and Lesser, are volcanic, and form the peaks of a mountain chain continuous with the N. E. range of Venezuela, and rising in Cuba, Hayti, and Jamaica into summits from 6,000 to 8,000 ft. high, and in many of the Lesser Antilles to the height of 4,000 to 5,000 ft. Hayti, Jamaica, and some other islands occasionally experience slight earthquake shocks. The volcano in Guadeloupe occasionally emits smoke and flame, but the latest violent eruption in the archipelago was in St. Vincent in 1812. Hurricanes occur nearly every year, and are sometimes very destructive, especially in the Lesser Antilles. The Bahamas are intensely hot, though for a part of the day the sea breezes temper the heat. The more mountainous islands have a temperate climate. Gold, silver, alum, copper, and coal are found in Cuba; gold, silver, copper, tin, iron, and rock salt in Hayti; lead, copper, and salt in Jamaica; gold, copper, iron, lead, and coal in Porto Rico; asphaltum and petroleum in Trinidad; and salt in the Bahamas. The characteristic feature of the botany of the West Indies is the predominance of ferns and orchidaceous plants. The forests furnish mahogany, lignum vitæ, granadilla, rosewood, and other valuable woods. Tropical fruits abound. Of spices, drugs, and dye stuffs, ginger, pepper, aloes, sassafras, annatto, cochineal, logwood, and indigo are the principal. Maize, tobacco, coffee, sugar, and cotton are cultivated. Of the formerly existing wild animals, the agouti, peccary, raccoon, and wild boar, the last only remains. Birds are numerous, and their characteristics are beautiful and varied plumage and lack of song. Reptiles abound, including turtles, lizards, and snakes. Fish are very abundant. Insects and reptiles are the pest of the islands.—When Columbus discovered the West Indies, the southern islands were peopled by the Caribs, a fierce tribe, and the northern by the Arrawaks, a gentler race. Both are now nearly extinct. About half of the entire population are white.

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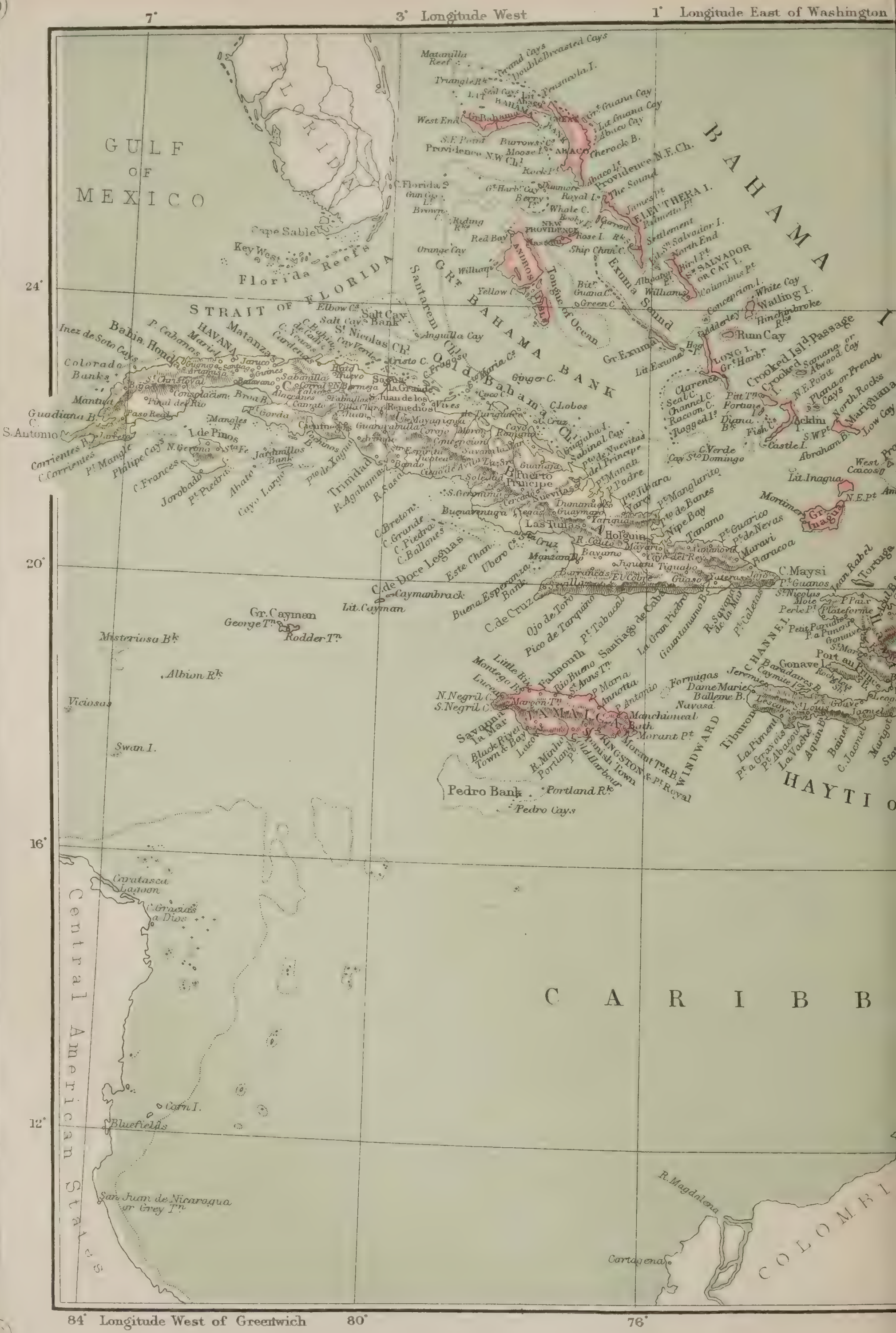
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3° Longitude West
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GULF OF MEXICO
FLORIDA
Cape Sable
Key West
Florida Reefs
STRAIT OF FLORIDA
BAHAMA
GRt. BAHAMA BANK
Old Bahama Ch.
Tongue of Ocean
Exuma Sound
NEW PROVIDENCE
Nassau
ABACO
ELEUTHERA I.
St. SALVADOR or CAT I.
Watling I.
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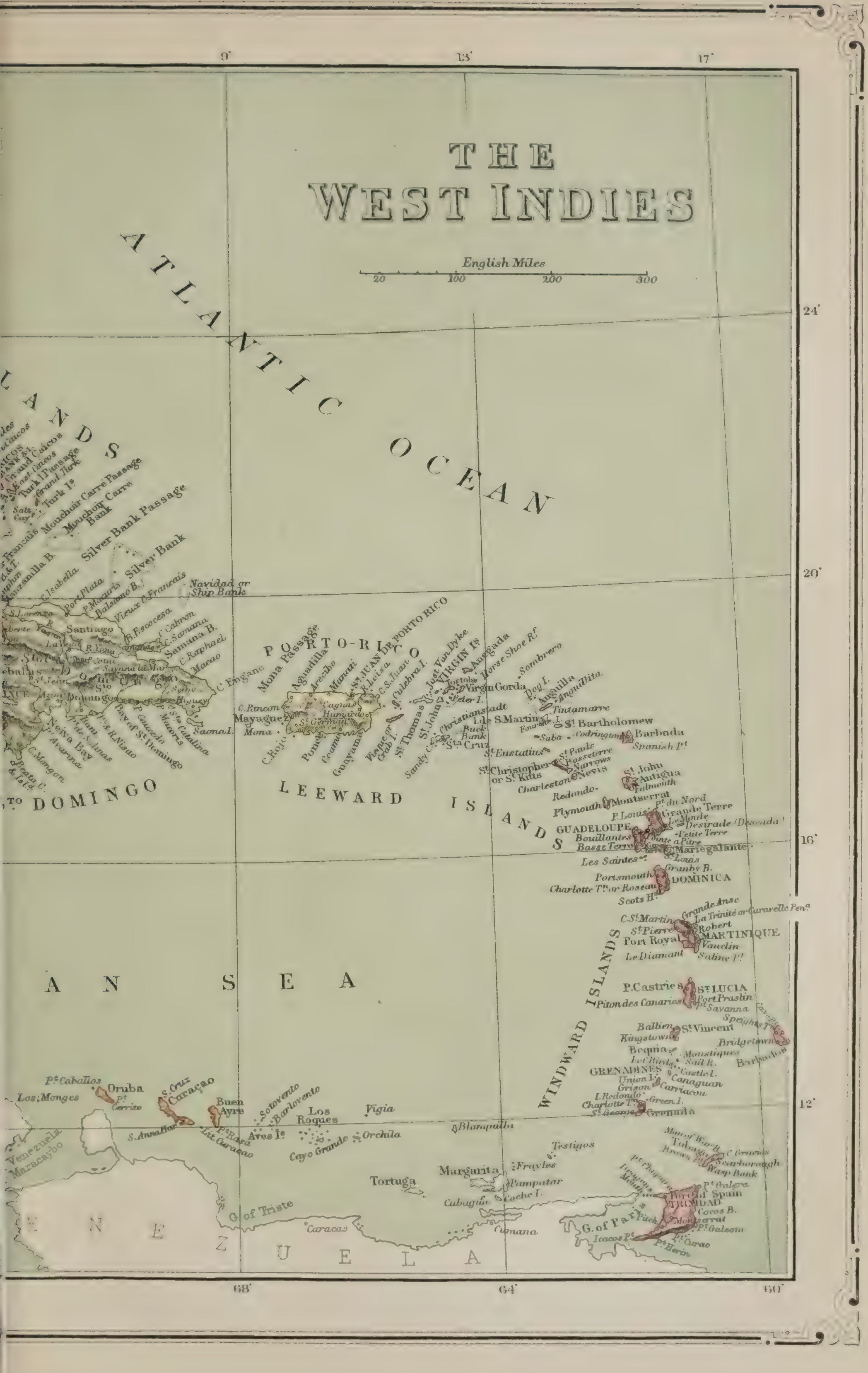
George Tn.
Rodder Tn.
Misteriosa Bk.
Albion Rk.
Viciosas
Swan I.
Montego B.
Falmouth
Savanna la Mar
N. Negril C.
S. Negril C.
JAMAICA
Spanish Town
KINGSTON
Pt. Royal
Morant Pt.
Portland Rk.
Pedro Bank
Pedro Cays
WINDWARD CHANNEL
Navasa
Tiburon
Jeremie
Gonave I.
Port au Prince
Mole St. Nicolas
HAYTI
Caratasca Lagoon
C. Gracias a Dios
Central American States
Corn I.
Bluefields
San Juan de Nicaragua or Grey Tn.
CARIBB
R. Magdalena
Cartagena
COLOMBI

THE WEST INDIES



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Slavery is abolished in all the islands except those of Spain. Spanish, French, and English are the languages spoken, though in Hayti the colored races use a *patois* combining the African tongues with French and Spanish. In the Spanish, French, and Venezuelan islands, and Hayti, the Roman Catholic religion prevails; and in the British islands Anglican Protestantism is established.

WESTMACOTT. I. Sir **Richard**, an English sculptor, born in London in 1775, died there, Sept. 1, 1856. He studied at first under his father and afterward under Canova, remaining in Italy from 1793 to 1797. Among his works are statues of Pitt, Fox, and Addison; the duke of York on the column in Waterloo place; the colossal equestrian bronze statue of George III. at Windsor; and the monuments of Collingwood, Abercromby, Pakenham, and Erskine. He also excelled in the representation of children. His "Psyche" and "Cupid," "Nymph and Cupid," and the large rilievo of the "Dream of Horace" evince both skill and a feeling for the antique. In 1827 he succeeded Flaxman as professor of sculpture at the royal academy, and in 1837 was knighted. **II. Richard,** son of the preceding, born in London in 1799, died April 19, 1872. He studied under his father and in Italy from 1820 to 1826. He treated subjects taken from classic mythology in his father's style, but excelled in devotional and monumental works. Among the latter are the recumbent figure of the archbishop of Canterbury, the "Angel Watching" on the Ashburton monument, "David as the Slayer of Goliath," and the group of figures on the pediment of the royal exchange. He succeeded his father as professor of sculpture in 1857.

WESTMANLAND, a S. E. län of Sweden, in Svealand, bounded E. by the län of Stockholm; area, 2,549 sq. m.; pop. in 1874, 119,485. It is mountainous, and contains many mines. Iron and copper are the principal products; silver is mined at Sala. There is little tillable land. Capital, Westeras.

WESTMEATH, a central county of Ireland, in the province of Leinster, bordering on Cavan, Meath, King's, Roscommon, and Longford; area, 678 sq. m.; pop. in 1871, 78,416. The surface is hilly in the north. The principal rivers are the Shannon and the Boyne. The soil is barren in the west. Cattle raising is the chief occupation. Capital, Mullingar.

WESTMINSTER ABBEY. See LONDON, vol. x., p. 600.

WESTMINSTER ASSEMBLY OF DIVINES, a convocation of clergymen and laymen, who assembled at Westminster, England, by direction of parliament, July 1, 1643, and remained in session till Feb. 22, 1649. The attempt of Charles I. to force upon the Scottish church the liturgy of the church of England, and the dissatisfaction both in England and Scotland with the oppression which had been exercised against the dissenting bodies, led the parliamentary commissioners to propose to the king, in the negotiations at Oxford (Jan. 30 to April 17, 1643), that he should give his assent to "a bill for calling an assembly of learned and godly divines and others, to be consulted with by the parliament for the settling of the government and the liturgy of the church of England, and for the vindication of the doctrine of the said church from false aspersions and interpretations." This proposition was not sanctioned by the king, but was afterward converted into "an ordinance of the lords and commons in parliament," and passed June 12, 1643. By this act 121 clergymen, 10 lords, and 20 lay commoners were summoned by name, to meet and constitute the assembly. To these were subsequently added, to fill vacancies, about 20 more. Of those thus appointed about 20 were clergymen of the church of England, and several of them afterward bishops. The king on June 22 by a proclamation forbade the meeting of the assembly, and few of the church of England members took their seats. On the opening of the assembly 69 of the clerical members were in attendance, and at different times 96 of them were present, though the usual attendance ranged between 60 and 80. The great body of the members, both clerical and lay, were Presbyterians; 10 or 12 were Independents, or as they called themselves Congregationalists; and five or six styled themselves Erastians. All, or nearly all, were Calvinists. On Sept. 15 four Scottish ministers and two lay assessors were, by a warrant from the parliament, admitted to seats in the assembly (but without votes), as commissioners from the church of Scotland, which on Aug. 17 had passed the "Solemn League and Covenant," binding on their part the ecclesiastical bodies of the two nations in a union, which was substantially Presbyterianism. The "Solemn League and Covenant" was subsequently accepted by the Westminster assembly, and the English parliament ordered it to be printed Sept. 21, and subscribed on Sept. 25, when the house of commons, with the Scottish commissioners and the assembly of divines, met in the church of St. Margaret's, Westminster. The house of lords did not take the covenant till Oct. 15. It was expressly provided in the "ordinance" that the assembly should not assume or exercise any jurisdiction, power, or authority ecclesiastical whatsoever, or any other power, except merely the right "to confer and treat among themselves of such matters and things, touching and concerning the liturgy, discipline, and government of the church of England, or the vindicating and clearing of the doctrine of the same," &c. The power of the Independent party in the parliament was constantly growing during their session, and its influence was sufficient to prevent much action which would otherwise have been taken, in the way of advice and recommendation, by the assembly. The important part of the assembly's work was all performed in the first three or four years of its existence. The parliament ordered the members, Oct. 12, 1643, forthwith to "confer and treat among themselves of such discipline and government as may be most agreeable to God's holy word, &c., to be settled in this church, in stead and place of the present church government by archbishops, bishops, &c., which is resolved to be taken away; and touching and concerning the directory of worship, or liturgy, hereafter to be in the church." In compliance with this order, the assembly took up "church government," so far as it referred to ordination, and on April 20, 1644, laid their advice before both houses of parliament, by whom it was not finally ratified till Oct. 2. The "Directory for Public Worship" was taken up May 21, and on Nov. 20 the greater part was presented to parliament. Marriage, burial, visiting the sick, &c., were still behind. On Dec. 3 the part pertaining to marriage was completed, and ordered to be sent to both houses of parliament. On the last day of the year 1644 the rest of the directory was sent up, and it was established by an ordinance, Jan. 3, 1645. The "Confession of Faith" was submitted in part to the house of commons on Sept. 25, and to the house of lords on Oct. 1, 1646; the remainder was carried up to the commons on Dec. 4, and to the lords on Dec. 7. The house of lords passed the first part of the "Confession of Faith" to a third reading on Nov. 6, and then sent it to the commons for concurrence. On Feb. 16, 1647, the lords passed the remainder, asking the concurrence of the lower house to this also; but owing to political and other disturbances nothing definite was done by the house of commons till February, 1648, and then with such difference as called for conferences, the first of which was held March 22. On June 20 the lords sent in their agreement to all the alterations, except that pertaining to marriage; and in this form the "Confession of Faith" was adopted by parliament. A copy of this authorized form (omitting chapters xxx. and xxxi., paragraph 4 of chap. xx., paragraph 4 in part and all of paragraph 5 and 6 of chap. xxiv.) is in the British museum. The "Larger Catechism" was sent to the house of commons on Oct. 22, 1647; the "Shorter Catechism" on Nov. 25, 1647. In the autumn of 1648 both houses of parliament ordered the printing and publishing of the "Shorter Catechism," but the house of lords was discontinued before it had acted on the "Larger Catechism." The other papers issued by the assembly consisted only of admonitions to parliament and the nation, controversial tracts, letters to foreign churches, &c. The annotations on the Bible usually attributed to them, though made in part by some of the members, did not proceed from the assembly at all. Rutherford, the last of the Scottish commissioners, left the assembly Nov. 9, 1647, Gillespie having left in July of the same year, and the others the year before. In February, 1649, after it had held 1,163 sittings, the parliament by an ordinance changed what remained of the assembly into a committee for trying and examining ministers, and in this form it continued to hold weekly sittings till the dissolution of the long parliament, April 20, 1653. The "Directory for Public Worship" was adopted and ratified by the general assembly of the church of Scotland in February, 1645, the "Confession of Faith" in August, 1647, and the catechisms in July, 1648; and these are still the standards of that establishment. They are also recognized by the Free church of Scotland, and by the other seceding Presbyterian bodies in that country. The presbyterian form of church government was by vote of the house of commons to be tried for a year, but was never fully established in England by legislative authority; and at the restoration, as none of these acts had received the royal sanction, it was not deemed necessary to pass any act to restore episcopacy to its former authority. The confession of faith and catechism are now the standard of the English Presbyterians, and of the Irish Presbyterian church. They have been adopted, with slight alterations, by all the Presbyterian bodies in the United States, and the "Directory for Worship," with some modifications, is in general use in these bodies. The "Shorter Catechism" was also introduced into New England by the early ministers, and formed a part of the "New England Primer," which for two centuries was the book of primary instruction of the children of Puritan families. The Congregationalists, as a denomination, recognize the confession of faith and catechisms as substantially expressing their doctrines. Dr. Thomas Goodwin, a member of the assembly, wrote, says his son, 14 or 15 volumes of notes of its daily proceedings; there are two volumes by George Gillespie, one of the Scottish commissioners, in the advocates' library, Edinburgh; also the official minutes of the assembly, in three folio volumes, in Dr. Williams's library, London, edited in part by Al. F. Mitchell.—See "History of the Westminster Assembly of Divines" (Presbyterian board of publication, Philadelphia, 1841); Hetherington's "History of the Westminster Assembly of Divines" (8vo, Edinburgh, 1843); and Neal's "History of the Puritans."

WESTMORELAND. I. A S. W. county of Pennsylvania, bounded N. W. by the Alleghany river and N. and N. E. by the Conemaugh and Kiskiminetas rivers, and drained by the Youghiogheny river and Loyalhanna, Jacob's, and Big Sewickley creeks; area, 1,040 sq. m.; pop. in 1870, 58,719. The S. E. part is mountainous, and has a poor soil; the other parts are hilly and fertile. Iron ore, bituminous coal, and salt are very abundant. The Pennsylvania canal passes along the N. border, and the county is intersected by the Pennsylvania, the Pittsburgh, Washington, and Baltimore, and the Alleghany Valley railroads. The chief productions in 1870 were 676,599 bushels of wheat, 43,886 of rye, 1,168,498 of Indian corn, 1,358,208 of oats, 148,248 of potatoes, 1,206,845 lbs. of butter, 178,650 of wool, and 61,495 tons of hay. There were 15,144 horses, 16,349 milch cows, 21,870 other cattle, 47,938 sheep, and 24,372 swine; 7 manufactories of agricultural implements, 1 of boats, 8 of bricks, 23 of carriages and wagons, 1 of cars, 1 of rectified coal oil, 5 of iron castings, 2 of paper, 16 of saddlery and harness, 9 of woollen goods, 23 flour mills, 31 tanneries, 16 currying establishments, 8 distilleries, 7 planing mills, and 7 saw mills. Capital, Greensburg. **II.** An E. county of Virginia, separated from Maryland by the Potomac, and bounded W. partly by the Rappahannock river, occupying a part of the peninsula called the northern neck; area, 316 sq. m.; pop. in 1870, 7,682, of whom 4,151 were colored. It has a diversified surface, and the soil along the streams is very fertile. This county was the birthplace of George Washington, James Monroe, and Richard Henry Lee. The chief productions in 1870 were 29,896 bushels of wheat, 189,381 of Indian corn, 25,585 of oats, 3,497 lbs. of wool, and 4,245 of tobacco. There were 663 horses, 1,243 milch cows, 2,952 other cattle, 2,057 sheep, and 4,896 swine. Capital, Montross.

WESTMORELAND, or **Westmorland,** a N. county of England, bordering on Cumberland, Durham, Yorkshire, and Lancashire, and Morecambe bay; area, 783 sq. m.; pop. in 1871, 65,005. The surface, except that near the coast, is mountainous; the Pennine chain stretches across the N. E. part, and curving forms the boundary between Westmoreland and Yorkshire; while the principal chain of the Cumbrian mountains extends from Helvellyn in Cumberland to Bowfell, and sends a spur through the centre of the county. Westmoreland is frequently called the lake region of England; its most celebrated lakes are the Ulleswater, Grasmere, Rydal Water, and Windermere on the western border. The principal streams are the Kent, which has a navigable estuary in the county, the Eden, and the Lune. The minerals are graphite, slate, marble, coal, lead, and copper. Cattle and sheep are very numerous, and bacon and ham, geese, and fish from the lakes are largely exported. The Lancaster canal extends to Kendal in the S. part of the county. Capital, Appleby.

WESTMORLAND, a S. E. county of New Brunswick, Canada, bordering on Northumberland strait, Nova Scotia, and the bay of Fundy; area, 1,284 sq. m.; pop. in 1871, 29,335, of whom 11,871 were of English, 9,356 of French, 3,719 of Irish, 3,148 of Scotch, 533 of Dutch, and 457 of German origin or descent. It is drained by the Petitcodiac, which forms part of the S. W. boundary, and by other streams. The surface is diversified with hills and valleys, and is heavily wooded. Much timber is shipped. The Intercolonial railway traverses the county. Capital, Dorchester.

WESTON, a city of Platte co., Missouri, on the Missouri river, and on the Kansas City, St. Joseph, and Council Bluffs railroad, 30 m. N. W. of Kansas City, and 260 m. W. by N. of St. Louis; pop. in 1870, 1,614, of whom 274 were colored; in 1875, about 2,000. It contains two flouring mills, three saw mills, a hemp factory, a furniture factory, a tannery, a large brewery, two wagon factories, a tobacco warehouse, two banks, a public school, a weekly newspaper, and nine churches.

WESTPHALIA (Ger. *Westfalen*, or *Westphalen*), a W. province of Prussia, bordering N. W. on Holland, and on the other sides mainly on the province of Hanover and the Rhine province; area, 7,799 sq. m; pop. in 1871, 1,775,175, including 17,000 Jews and 130 Mennonites, the bulk being half Catholic, half Protestant. In the north and northeast are the Weser mountains. The mountainous region S. of the Ruhr is called Sauerland; its highest point, the Astenberg (about 2,750 ft.), at the sources of the Ruhr and Lenne, connects with the Ederkopf (about 2,350 ft.) at the source of the Eder, and near the N. E. extremity of the Westerwald. The Teutoburg Forest, where Arminius defeated the Roman legions of Varus, is the most celebrated of the mountain ranges which partly traverse Westphalia, though the battle field is not within the province. The chief rivers, the Weser, Ruhr, Lippe, and Ems, have fertile valleys. Coal and iron are extensively mined. Grain, fruit, hops, tobacco, and timber are produced in moderate quantities, and flax, potatoes, hemp, and wool abundantly. Cattle, goats, swine, and horses are numerous. Westphalia hams and the bread called *Pumpernickel* are celebrated, as are also the manufactories of linen, silk, paper, scythes, and needles. The other manufactures include glass, leather, cotton, and woollens. The iron and other metal productions are estimated at one fourth of those of all Prussia. The peasantry and small farmers are the principal landed proprietors in the south and west, which are more prosperous than the other regions. Westphalia is divided into the districts of Arnsberg, Minden, and Münster. The most noted towns are Münster, the capital, Minden, Bielefeld, Iserlohn, Dortmund, Paderborn, and Soest.—The name Westphalia was at various periods bestowed upon portions of western Germany differing materially in extent and location and in the form of their government. The territory between the Rhine and the Weser is that to which the name properly belongs, and it is said to be derived from the Westphales, an ancient Saxon tribe who inhabited the territory. The duchy of Westphalia originally comprised chiefly the Sauerland, but was gradually extended over several adjoining districts. It was given in 1179 to the archbishop of Cologne as a fief, and remained in the possession of that see till 1802, when it was ceded to Hesse-Darmstadt, and in 1815–'17 was incorporated with Prussia. The circle of Westphalia comprised the territory between the Rhine and the Weser, including the districts N. of the duchy of Westphalia lying on or near the North sea, and several territories W. of the Rhine. It included the bishoprics of Münster, Paderborn, Osnabrück, and Liége; the principalities of Minden, Mörs, Verden, and East Friesland; the duchies of Cleves, Jülich, Berg, and Oldenburg; the counties of Mark, Schaumburg, Ravensberg, Hoya, Pyrmont, Delmenhorst, Lippe, Bentheim, and Diepholz; the abbeys of Corvey, Stablo, and Malmedy; and the free cities of Cologne, Aix-la-Chapelle, and Dortmund. The elector of Brandenburg as duke of Cleves, and the elector palatine as duke of Jülich, were directors of the circle alternately with the bishop of Münster. This circle ceased to exist at the dissolution of the German empire in 1806. The French kingdom of Westphalia, established by Napoleon I., Aug. 18, 1807, for his brother Jerome, was between the Elbe and the Rhine, having an area of about 15,000 sq. m., and a population of 2,000,000. It included Hesse-Cassel (excepting Hanau and Katzenellenbogen), Brunswick-Wolfenbüttel, the portions of the Prussian provinces of Altmark and Magdeburg lying W. of the Elbe, the Hanoverian provinces of Göttingen and Osnabrück, besides Minden, Paderborn, Ravensberg, Hildesheim, Goslar, and other towns and districts taken from Prussia, Hanover, and Saxony. In October, 1813, King Jerome was expelled from Cassel, his capital, and the kingdom was dissolved. (See BONAPARTE, JÉRÔME, vol. iii., p. 26.) The Westphalian treaties, which terminated the thirty years' war, were finally signed on Oct. 24, 1648. (See THIRTY YEARS' WAR.)

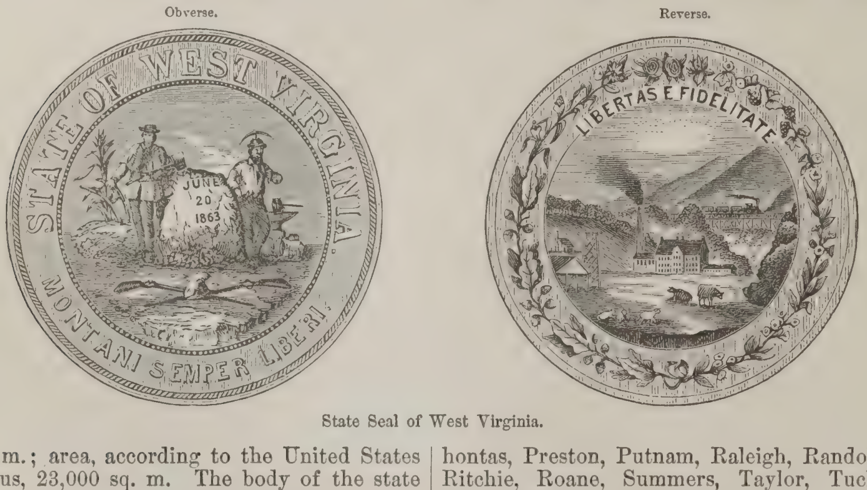
WEST POINT, a village in the town of Cornwall, Orange co., New York, on the W. bank of the Hudson river, at its passage through the Highlands, 50 m. above New York city; pop. in 1870, 942. It is the seat of the United States military academy. The point itself, including a tract of mountain land adjoining it on the west and northwest, amounting altogether to 1,795 acres, was purchased by the United States from Stephen Moore in 1790. An additional tract on the south was bought of Oliver Gridley in 1824. The entire domain contains 2,105 acres. The state of New York ceded its jurisdiction over a small portion of this area, embracing little more than the plain of West Point, in 1826. Upon this plain, which contains about 160 acres and is about one mile in circuit, are the principal buildings of the academy, so arranged along its western and southern margin as to leave a large unoccupied area for tactical instruction and parades. Its surface is 160 to 180 ft. above the level of the river, with bold and rocky cliffs on the east and northeast, commanding river views of almost unparalleled beauty, and on the north a more gentle declivity. It is closely flanked on the west by abrupt hills and mountain spurs, with altitudes varying from 500 to 1,500 ft., the highest of which, rising precipitously from the river a little more than a mile to the northward, is Old Crow Nest. The ruins of Fort Putnam, a relic of revolutionary times, tower above the plain on Mount Independence, about three fourths of a mile S. W. of the extremity of the point. During the war of the revolution the position of West Point possessed great strategic importance, commanding the only line of water communication by which the enemy on the Atlantic coast could receive co-operation from Canada. Some weak defensive works called Fort Constitution had been erected on the E. bank of the river, upon Martelaer's rock (now Constitution island), as early as November, 1775; and in 1776 two temporary works styled Fort Montgomery and Fort Clin-

West Point.

ton were constructed 6 m. below on the W. bank of the stream, and the river was obstructed at that point by a chain. All these defences fell into the hands of the enemy on Oct. 6, 1777, but the positions were abandoned on the receipt, a few days later, of the news of Burgoyne's surrender. In January, 1778, the work of fortifying West Point was begun by the erection of an enclosed work built of fascines, timber, and earth, called at first Fort Arnold and subsequently Fort Clinton, on the N. E. angle of the plain. The construction of Fort Putnam, of stone, was commenced. During 1779 and 1780 eight other smaller works and redoubts were erected on the summits of the principal eminences W. and S. of the plain. The river was obstructed in 1778 by a heavy chain and boom stretched across between West Point and Constitution island. Early in August, 1780, West Point, including its dependencies, was assigned to the command of Maj. Gen. Benedict Arnold, and six weeks later it became the theatre of his treason and flight, his immediate object being to deliver up the defences of the Highlands to the enemy. After the war the defences of the place were allowed to fall into decay. In 1828 a monument was erected by the cadets to the memory of Kosciuszko, who mainly superintended their construction.—The idea of establishing a military academy at West Point appears to have been first suggested in 1783 by Col. Pickering, quartermaster general of the army; but it was not until May 7, 1794, that provision for any military school was made by congress. Under that act four battalions of engineers and artillerists were organized, to each of which four cadets were attached; and in 1798 an additional regiment of artillerists was authorized and the number of cadets was increased to 56. The president was empowered to appoint four teachers for the instruction of the corps, but no provision was made for assembling the artillerists and engineers at any one point. By the act of March 16, 1802, fixing the military peace establishment, 40 cadets were attached to the artillery and 10 to the corps of engineers, and that corps was constituted a military academy and stationed at West Point, the senior officer of engineers present being the superintendent thereof. This was the beginning of the present military academy. By the act of Feb. 28, 1803, the president was authorized to appoint a teacher of the French language and a teacher of drawing, and in July following one teacher was appointed to perform the duties of both positions. The act of April 29, 1812, provided that the military academy should consist of the corps of engineers and the following professors, in addition to the teachers of the French language and drawing already provided, viz.: a professor of natural and experimental philosophy, with the pay and emoluments of a lieutenant colonel, and a professor of mathematics and one of engineering, each with the pay and emoluments of a major; and it was provided that these professors might be officers of the corps of engineers or otherwise at the discretion of the appointing power, each professor to have an assistant professor to be taken from among the most capable of the officers or cadets, and to receive the pay and emoluments of a captain. The same act fixed the number of cadets not to exceed 250, to be appointed between the ages of 14 and 21 years, and to be well versed in reading, writing, and arithmetic when appointed. The professorship of geography, history, and ethics was created April 14, 1818 (the chaplain to be professor); that of chemistry, mineralogy, and geology in 1838; those of drawing and the French language in 1846; that of the Spanish language in 1857; and that of law in 1874. For purposes of military police, discipline, and infantry drill, the cadets are organized into a battalion of four companies, the battalion staff and the company officers being cadets. Each company is in charge of an army officer styled an assistant instructor of infantry tactics, and the battalion is commanded by the commandant of cadets, also an officer of the army, who by the act of 1858 was made instructor of artillery, cavalry, and infantry tactics, with the local rank of lieutenant colonel. There are also an instructor of practical military engineering, signalling, and telegraphy, an instructor of ordnance and gunnery, and a sword master. The selection of the superintendent was confined to the corps of engineers till the act of July 13, 1866, which opened it to the entire army. By act of June 12, 1858, the local rank of colonel was conferred upon the superintendent. The officers of the academy at the present time (1876) are the superintendent, with five officers constituting his military staff; the commandant of cadets and instructor of artillery, cavalry, and infantry tactics, with six assistants; the professor of mathematics, with eight assistants; the professor of drawing, with two assistants; the professor of chemistry, mineralogy, and geology, with two assistants; the professor of the Spanish language, with two assistants; the professor of natural and experimental philosophy, with four assistants; the professor of the French language, with four assistants; the professor of military and civil engineering, with two assistants; the professor of law; the chaplain and professor of ethics; the instructor of practical military engineering, &c., with one assistant; the instructor of ordnance and gunnery, with one assistant; and the sword master; total, 51. Cadets are admitted between the ages of 17 and 21 years. The authorized number is determined by the law that each congressional district, each territory, and the District of Columbia are respectively entitled to have one cadet at the academy, and ten are also appointed yearly at large. The appointments at large are conferred by the president; those from the districts and territories by the secretary of war on the nomination of the representative or delegate in congress. To secure admission, candidates must be well versed in arithmetic, reading, and writing, including orthography, and must have a knowledge of the elements of English grammar, of descriptive geography, particularly of their own country, and of the history of the United States. The pay of a cadet is $500 a year and one ration, against which are charged his board, clothing, books, stationery, and other items of expense. The course of instruction occupies four years. The academic duties begin on Sept. 1, and continue till about June 20. From this time until the last days in August the cadets live in tents, and devote their time to military duties, riding, sword exercise, pyrotechny, practical military engineering, signalling, telegraphy, &c. On graduation, the cadet is commissioned in the engineers, ordnance, artillery, infantry, or cavalry, according to the duties he may be judged competent to perform. The total number of graduates from 1802 to 1876 was 2,613, less than half of those who entered the institution during that time.—See "Biographical Register of the Officers and Graduates of the United States Military Academy at West Point, N. Y.," by Gen. George W. Cullum (2 vols. 8vo, 2d ed., New York, 1868).

WEST TROY, a village in the town of Watervliet, Albany co., New York, on the W. bank of Hudson river, opposite Troy, and 6 m. N. of Albany; pop. in 1860, 8,820; in 1870, 10,693; in 1875, about 14,000. It is connected with Albany by steamboat, rail, and horse cars, and with Troy by two bridges and three ferries. An arm of the Mohawk river here enters the Hudson, which is also connected at West Troy with the Erie and Champlain canals. There is an extensive trade in lumber. The Watervliet national arsenal occupies 105 acres in the centre of the village, and manufactures large quantities of army equipments. The chief private manufactories are three furnaces, employing about 50 hands each; a chair factory, 100 hands; a manufactory of woollen shawls and one of butts and hinges, employing together 500 hands; a car factory, 50 hands; a manufactory of railroad car journal boxes, Meneely's bell foundery, and two planing mills. There are a national bank, four public schools, a weekly newspaper, and nine churches, viz.: Baptist, Episcopal, Methodist (2), Presbyterian, Reformed (2), and Roman Catholic (2). The village was incorporated in 1836.

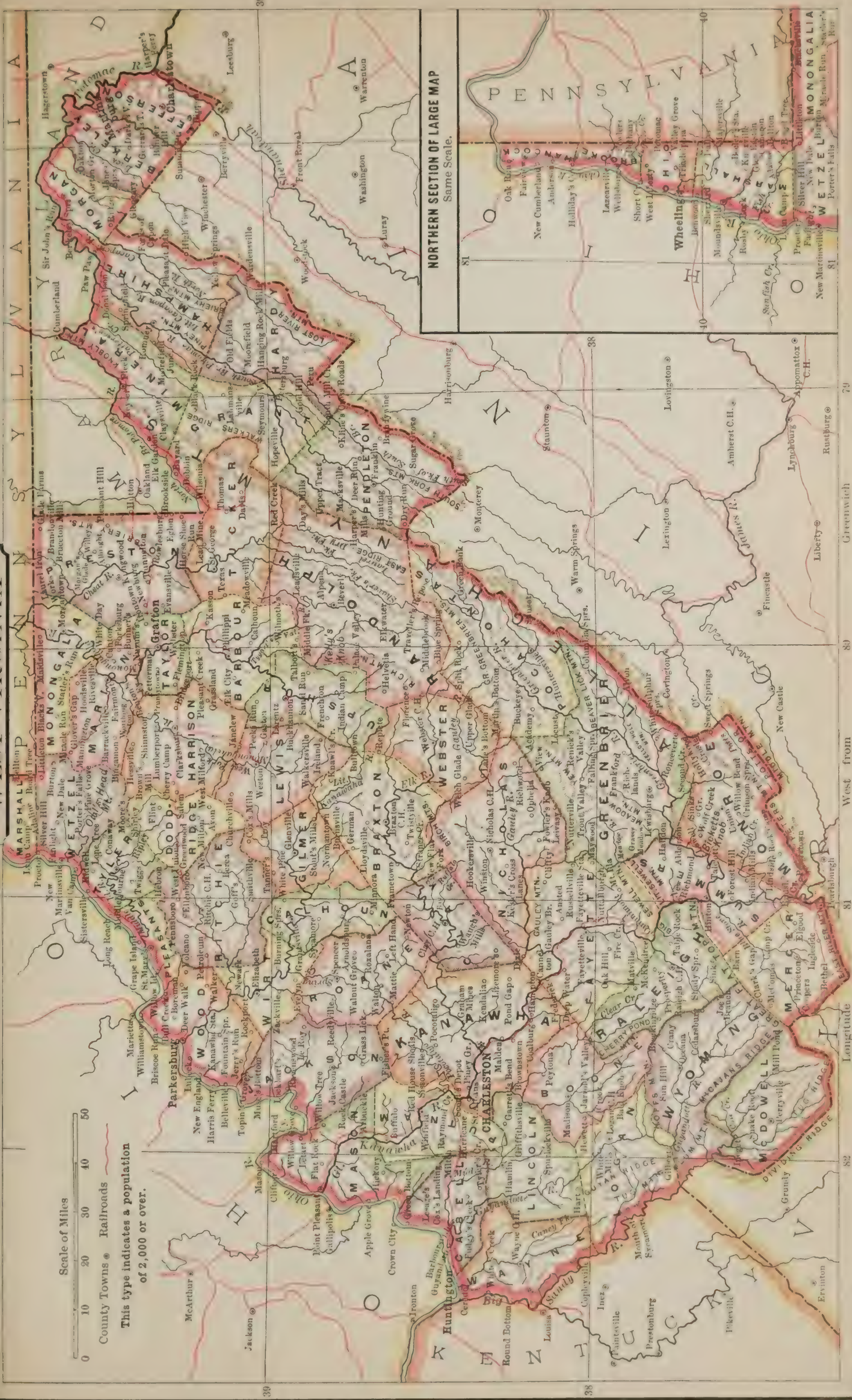
WEST VIRGINIA, a state of the American Union, organized from a part of Virginia in 1863, lying between lat. 37° 10′ and 40° 38′ N., and lon. 77° 40′ and 82° 40′ W. It is bounded N. by Pennsylvania and Maryland, E., S. E., and S. by Virginia, and W. by Kentucky, from which it is divided by the Big Sandy river, and Ohio, from which it is separated by the Ohio river. Its greatest length N. and S. is nearly 240 m.; greatest breadth, 160 m.; area, according to the United States census, 23,000 sq. m. The body of the state lies below lat. 39° 43′ N.; but a narrow strip, known as the "Pan-handle," extends nearly a degree further north, between Pennsylvania and the Ohio river. The state contains 54 counties, viz.: Barbour, Berkeley, Boone, Braxton, Brooke, Cabell, Calhoun, Clay, Doddridge, Fayette, Gilmer, Grant, Greenbrier, Hampshire, Hancock, Hardy, Harrison, Jackson, Jefferson, Kanawha, Lewis, Lincoln, Logan, Marion, Marshall, Mason, McDowell, Mercer, Mineral, Monongalia, Monroe, Morgan, Nicholas, Ohio, Pendleton, Pleasants, Pocahontas, Preston, Putnam, Raleigh, Randolph, Ritchie, Roane, Summers, Taylor, Tucker, Tyler, Upshur, Wayne, Webster, Wetzel, Wirt, Wood, and Wyoming. The capital and largest city is Wheeling, which in 1870 had 19,280 inhabitants. The other most important cities and towns, with their population in 1870, are: Charleston (the former capital), 3,162; Clarksburg, 2,900; Grafton, 1,987; Martinsburg, 4,863; Parkersburg, 5,546; Piedmont, 1,366; South Wheeling, 3,158. The population of the state in 1870, and of the territory now forming West Virginia prior to that time, was as follows:


Obverse.

Reverse.

State Seal of West Virginia.

WEST VIRGINIA



YEARS.	White.	Free colored.	Slave.	Aggreg'te.
1790	50.593	612	4,668	55.873
1800	70.894	526	7,172	78,592
1810	93.355	1,278	10,836	105,469
1820	120.236	1,413	15,119	136,768
1830	157.084	2,167	17,673	176,924
1840	203,016	3,033	18,488	224,537
1850	278.731	3.082	20,500	302.813
1860	355.526	2.773	18,371	376,688
1870	424,033	17,980	......	442,014

The rank of the state in 1870 was 27. Of the total population, 222,843 were males and 219,171 females; 424,923 of native and 17,091 of foreign birth. Of the natives, 381,297 were born in Virginia and West Virginia, 2,298 in Kentucky, 7,323 in Maryland, 1,359 in New York, 12,264 in Ohio, and 15,497 in Pennsylvania. Of the foreigners, 6,832 were born in Ireland, 6,232 in Germany, and 1,811 in England. The density of population was 19·22 persons to a square mile. There were 78,474 families, with an average of 5·63 persons to each, and 78,854 dwellings, with an average of 5·61 to each. There were 76,879 males and 73,965 females from 5 to 18 years of age, 76,832 males from 18 to 45, 95,317 males 21 years old and upward, and 93,435 male citizens 21 years old and upward. There were 48,802 persons 10 years of age and over who could not read, and 81,490 unable to write; of the latter, 20,046 white and 1,865 colored were from 10 to 15 years of age, 11,721 white and 1,704 colored from 15 to 21, and 39,726 white and 6,628 colored 21 years old and over. The state contained 168 blind, 218 deaf and dumb, 374 insane, and 427 idiotic. Of the total population 10 years of age and over (308,424), there were engaged in all occupations 115,229; in agriculture, 73,960, including 30,087 laborers and 43,702 farmers and planters; in professional and personal services, 16,699, of whom 466 were clergymen, 6,676 domestic servants, 5,815 laborers not specified, 400 lawyers, 612 physicians and surgeons, and 866 teachers; in trade and transportation, 6,897; and in manufactures and mechanical and mining industries, 17,673, of whom 1,525 were miners. The total number of deaths from all causes was 4,018, the ratio of mortality being ·91 per cent.; from consumption 709, there being 5·7 deaths from all causes to one from this disease; from pneumonia, 258; diphtheria, 186; scarlet fever, 157; cerebro-spinal, enteric, and typhus fevers, 185; diarrhœa, dysentery, and enteritis, 233.—A large part of West Virginia is mountainous and hilly. The hills are very fertile to their tops, which are cultivated, and present a remarkable growth of grass. The soil, being clay, does not wash away. The Alleghany range extends along the E. border, and presents the highest levels in the state. Nearly parallel to it on the west, and distant from 20 to 40 m., is a series of ridges and mountains which might properly be termed a continuation of the Cumberland mountains, embracing what are locally known as Flat Top, Cotton Hill, Greenbrier, Gauley, Birch, and Rich mountains, Laurel Hill, &c. The country slopes W. to the valley of the Ohio, and excepting the Potomac, which forms a part of the boundary between this state and Maryland, and its affluents, the rivers of West Virginia are tributary to the Ohio. The chief ones flowing directly into that river are the Big Sandy, Guyandotte, Great Kanawha (called New in the upper part of its course), Little Kanawha, and Monongahela, all of which are navigable. The most important tributaries of the Great Kanawha are the Greenbrier, Gauley, and Elk rivers on the north, and Coal river on the south. The Monongahela is formed in the N. part of the state by the confluence of its West branch and Tygart's Valley river, which have a northerly course. Its chief affluent is the Cheat river, which rises near the sources of the South branch of the Potomac. In the N. E. part of the state the North and South branches of the Potomac flow N. to form that river. All of these streams and their tributaries afford water power of unusual abundance; that at Harper's Ferry, formerly used by the United States government in the manufacture of arms, is the most conspicuous, though many other waterfalls and rapids in the state are not inferior in capacity. There is a system of locks and dams in the Little Kanawha, extending to Burning Spring in Wirt co., one of the oil regions of the state, to which point it is navigated by steamboats from Parkersburg. The national government is improving the Great Kanawha by locks and dams, as a part of the national water line from the Atlantic to the west. An appropriation of $400,000 was made for this purpose for the year 1875, and for the improvement of the Monongahela. The valley of the Great Kanawha is the finest grazing region of the state. Blue grass is indigenous. About two thirds of West Virginia is covered with forests. Large quantities of ginseng have been shipped from the state. The lumber trade is important. The chief kinds produced are oak, poplar, and hemlock, which abound throughout the state except on a few high levels. Next in importance, though not so abundant, are walnut, cherry, buttonwood, ash, chestnut, and locust. In the basins of the Kanawhas, Guyandotte, Monongahela and its tributaries, and Big Sandy, oaks, hickories, and poplars reach a height of from 75 to 100 ft. One of the most extensive pine regions in the state extends through Fayette and Raleigh counties along the New river.—The Alleghany coal field, which stretches from the N. part of Pennsylvania to the middle of Alabama, comprises within its limits the greater part of West Virginia. (See Coal.) The area of the coal formation in the state has been estimated at more than 15,000 sq. m., but much of this is unavailable for want of means of transportation, and mines have been opened in only a small part of it. The coal is found in two productive layers or groups, the upper and the lower, which are separated by the barren measures. Above the upper coal group is a second series of barren measures composed of alternate layers of shale and sandstone. The thickness of the whole, exclusive of the upper barren measures, is about 1,000 ft. The lower coal measures are about 250 ft. thick. In the N. part of the state they contain five seams of coal, the upper one being from 3½ to 4 ft. thick, and the others from 1 to 2½ ft. On the Kanawha river the coal seams are greater in number and size, and are among the best in the Alleghany coal region. The upper coal measures are more accessible and present larger seams in the N. part of the state. They are also about 250 ft. thick, and comprise four seams of coal, the lowest, the famous Pittsburgh bed, being 9 ft. thick. The others are 3½, 5½, and 7 ft. thick. Valuable beds of coal, convenient for mining and shipping, are worked along the Ohio river, on the line of the Baltimore and Ohio railroad in the N. part of the state, and in the Kanawha valley. One of the richest deposits of coal in the state is near Clarksburg, in the valley of the Monongahela. In one of the beds here, from 10 to 12 ft. thick, there are numerous mines which send large quantities of gas coal to the eastern and western cities; it is regarded as ranking among the best in the United States for the production of gas. The exposure of coal on the Great Kanawha is one of the most extensive and valuable in the United States. For nearly 30 m. above Charleston four beds of coal stretch along the hillsides in parallel and nearly horizontal bands; the lowest is about 6 ft. thick. On the Gauley, Coal, and other rivers in this region frequent beds of coal are exposed. The coal of West Virginia is generally bituminous, but valuable beds of cannel coal are worked. Splint or iron-smelting coal is found on the Kanawha; in Ritchie co. there is a vein of albertite similar to that in New Brunswick. The Kanawha valley is one of the great salt-producing regions of the United States. The salines are on both sides of the Kanawha river, and extend from Charleston for about 20 m. above. (See SALT, vol. xiv., p. 576.) Large quantities of salt are also produced in Mason co. on the Ohio, and in Braxton co. on the Elk and Little Kanawha rivers. Iron ore in various forms abounds generally throughout the state. In the S. part are valuable beds of hematite and oxides and peroxides of iron. The iron ore alternates in the same hills with coal. It is found in broken and continuous beds, and often yields from 50 to 80 per cent. of pure metal. In the vicinity of Laurel Hill and across the mountains to the Potomac the ore yields from 60 to 80 per cent. of iron, and is regarded as the best in the state. Valuable seams are also found in Braxton co., from which iron is now manufactured. Large quantities of petroleum are obtained in a belt from 1 to 2 m. wide, extending from the Little Kanawha to the Ohio through the counties of Wirt, Ritchie, Wood, and Pleasants. Limestone in its various modifications abounds in nearly all parts of the state. Fire clay and potters' clay are common in several counties. Sandstones are abundant, and grindstones may be made in almost any section. A valuable buhrstone is obtained in Laurel Hill. A handsome quality of amygdaloid, or variegated marble, is found in the E. part of the state on the Potomac. The pillars in the old hall of the house of representatives at Washington are made of this Potomac marble. Fine seams of a good quality of marble have been discovered in Webster co. In Marion co. is an extensive deposit of white sand, which is used in the manufacture of glass in Wheeling. Alum and copperas are found in the crystalline state on the outside of banks of sand rock and shales. West Virginia contains numerous valuable mineral springs. The most important are the White Sulphur and the Blue Sulphur in Greenbrier co.; the Red, the Salt, and the Sweet Sulphur in Monroe co.; the Berkeley springs in Morgan co.; the Capon springs in Hampshire co.; the Shannondale springs in Jefferson co.; the mineral wells near Parkersburg; and a white sulphur spring at Addison, in Webster co.—The climate of West Virginia is generally free from extremes of heat and cold. The air, especially in the highland sections, is pure and healthful, and favorable to persons having pulmonary complaints. At Morgantown, lat. 39° 36′ N., lon. 79° 52′ W., the mean temperature for the year ending June 30, 1875, was 51·7°; mean annual barometer, 30·049; amount of rainfall, 43·17 inches. The mean temperature of spring was 50·5°; summer, 71·4°; autumn, 54·1°; winter, 30·8°.—The soil and climate of West Virginia are generally well adapted to agriculture, stock raising, and fruit growing. According to the census of 1870, there were in farms 2,580,254 acres of improved land, 4,364,405 of woodland, and 1,583,735 of other unimproved land. The total number of farms was 39,778, having an average of 214 acres each. There were 13,158 containing from 20 to 50 acres, 9,077 from 50 to 100, 7,813 from 100 to 500, 242 from 500 to 1,000, and 43 over 1,000. The cash value of farms was $101,604,381; of farming implements and machinery, $2,112,937; total estimated value of all farm productions, including betterments and additions to stock, $23,379,692. In 1873 products valued at $14,187,511 were obtained from 945,349 acres, as follows:

CROPS.	Quantity produced.	Average yield per acre.	No. of acres in each crop.	Value.
Indian corn, bush.	10,004,000	29	344,965	$5,402,160
Wheat..........	2,657,000	9·6	276,771	3,799,510
Rye..............	261,000	12·8	20,390	219,240
Oats.............	2,762,000	27	102,296	1,049,560
Barley...........	56,000	24	2,333	51,520
Buckwheat.......	59,000	17·1	3,450	47,790
Potatoes.........	824,000	70	11,771	576,800
Tobacco, lbs......	2,967,000	775	3,828	275,931
Hay, tons........	197,500	1·1	179,545	2,765,000

The number and value of farm animals in 1874 were as follows:

ANIMALS.	Number.	Value.
Horses	104,600	$6,850,254
Mules	2,390	191,534
Oxen and other cattle	242,500	5,538,700
Milch cows	124,800	8,418,250
Sheep	555,900	1,400,868
Hogs	834,000	1,229,120
Total	1,863,690	$18,628,726

The amount of wool produced in 1870 was 1,593,541 lbs.; flax, 82,276 lbs.; butter, 5,044,475 lbs.; maple sugar, 490,606 lbs.; maple molasses, 20,209 gallons; sorghum molasses, 780,829 gallons; honey, 376,997 lbs. The produce of orchards was valued at $848,773; of market gardens at $69,974; of forests at $363,668; value of home manufactures, $615,412; of animals slaughtered or sold for slaughter, $4,914,792.—The abundance of water power, of minerals, and of timber gives to West Virginia marked advantages for manufacturing. The total number of establishments in 1870 was 2,444, having 509 steam engines of 17,136 horse power, and 683 water wheels of 10,195 horse power, and employing 11,672 hands; capital invested, $11,084,520; wages paid during the year, $4,322,164; value of materials used, $14,503,701; of products, $24,102,201. The most important were as follows:

INDUSTRIES.	No. of establishments.	Hands employed.	Capital.	Value of products.
Boots and shoes	252	429	$86,195	$349,018
Clothing, men's	41	291	111,848	399,049
Coal oil, rectified	10	82	125,050	432,650
Cooperage	101	549	125,632	488,476
Flouring and grist-mill products	476	770	1,589,257	3,933.902
Iron, forged and rolled	9	1,498	1,185,800	4.025,620
" nails and spikes	8	1,156	988.000	4,665,000
" pig	5	317	434,000	577,200
" castings	24	285	462,100	566,072
Leather, tanned	104	220	362,890	527,016
" curried	74	108	93,489	813,229
Liquors, distilled	10	79	218,441	207,258
" malt	11	48	145,100	157,530
Lumber, planed	5	98	179,000	198,140
" sawed	842	1,452	931,950	1,379,899
" staves, shooks, &c	1	63	50,000	98,500
Machinery	15	355	355,500	343,548
Salt	18	661	1,631,000	1,507,605
Tobacco, cigars	42	177	40,875	268,348
Wool-carding and cloth-dressing	45	66	52,200	105.572
Woollen goods	29	250	183,900	370,191

Besides the above, there were 184 mining establishments, employing 1,504 hands, with an invested capital of $2,040,213. The total value of products was $2,088,531, including bituminous coal valued at $1,035,862, petroleum, $1,029,119, and stone, $23,550.—In 1876 West Virginia had 600 m. of railroad. The lines, with their termini, total length, and mileage in the state, were as follows:

NAMES OF CORPORATIONS.	TERMINI.		LENGTH.	
	FROM	TO	Total.	In W. Virginia.
Baltimore and Ohio	Baltimore, Md	Wheeling	379	241
Branch	Grafton	Parkersburg	103	108
Chesapeake and Ohio	Richmond, Va	Huntington	421	199
Laurel Fork and Sand Hill	Laurel Fork Junction	Sand Hill	5	5
Pennsboro and Harrisville	Pennsboro	Harrisville	9	9
Pittsburgh, Cincinnati, and St. Louis	Pittsburgh, Pa	Columbus, O	198	7
Wheeling, Pittsburgh, and Baltimore *	Wheeling	Washington, Pa	82	14
Winchester and Potomac	Harper's Ferry	Winchester, Va	82	22

The Weston and West Fork, a narrow gauge railroad from Weston to Clarksburg, 23 m., is in process of construction. The Northern and Southern West Virginia railroad company has been organized to construct a line from Charleston to the Pennsylvania border; a survey and location of the road have been made under an appropriation from the state. Another projected railroad is the Washington and Ohio, from Alexandria, Va., to the Ohio river at Ravenswood in Jackson co., which has been surveyed and located, but for want of means has been completed only from Alexandria to the Blue Ridge near Hillsboro, Va. The line of this road is through some of the best coal and timber lands of West Virginia. Although the state is lacking in railroad facilities for the development and transportation to market of its rich mineral and timber resources, it is traversed by a system of good turnpike roads, affording communication through every county of the state.—Wheeling and Parkersburg are interior ports of delivery belonging to the United States customs district of Louisiana, to which foreign imports may be transported in bond after appraisement at New Orleans. In 1875 there were registered, enrolled, and licensed at Wheeling 201 vessels of 21,844 tons, and at Parkersburg 44 vessels of 4,505 tons. Boat building is carried on at Wheeling. The total number of national banks in November, 1875, was 15, having a paid-in capital of $1,846,000 and an outstanding circulation of $2,065,769.—The constitution, as amended in 1872, gives the right of suffrage to all adult male citizens who have resided in the state one year and in the county 60 days next preceding the election, excepting persons of unsound mind, paupers, and those who are under conviction of treason, felony, or bribery in any election. Only qualified voters are entitled to hold any state, county, or municipal office. The governor, judges, attorney

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* Operated by the Baltimore and Ohio company.

general, and senators must have been citizens of the state for five years next preceding their election or appointment. Any citizen engaging as principal or second in a duel is thereby disqualified from ever holding any office of honor, trust, or profit in the state. No citizen shall be denied the privilege of voting at any election because his name has not been registered or listed as a qualified voter. The legislative power is vested in a senate of 24 members elected for four years, and a house of 65 delegates elected for two years. The sessions of the legislature are biennial, beginning on the second Wednesday in January, in odd years; they are limited to 45 days, but may be extended with the concurrence of two thirds of the members elected to each house. The senate chooses a president from its own body. Each member of the legislature receives $4 a day and 10 cts. a mile for travel. The speaker of the house and the president of the senate receive each $6 a day and mileage. A majority vote is sufficient to pass a bill over the executive veto. The executive department consists of a governor, annual salary $2,700; secretary of state, $1,000; state superintendent of free schools, $1,500; auditor, $2,000; treasurer, $1,400; and attorney general, who is also reporter of the court of appeals, $1,300. They are elected by the people for four years. The governor is ineligible to the same office for two successive terms. The general state election is held on the second Tuesday in October; there will be an election for state officers in 1876. The judicial power is vested in a supreme court of appeals, in circuit, county, and corporation courts, and justices of the peace. The supreme court of appeals consists of four judges, who are elected for 12 years by the people and receive an annual salary of $2,250 each. It has original and appellate jurisdiction in cases of habeas corpus, mandamus, and prohibition, and appellate jurisdiction in civil cases where the amount exceeds $100, in controversies concerning the title or boundaries of land, the probate of wills, appointment of guardians, and some other enumerated matters. It has appellate jurisdiction in criminal cases where there has been a conviction for felony or misdemeanor in a circuit court. At least two terms of the court must be held every year. The state is divided into nine circuits, in each of which a circuit judge is elected by the people for eight years, and receives an annual salary of $2,000. A circuit court is held in every county twice a year. The circuit courts have the supervision of all proceedings before the county courts and other inferior tribunals by mandamus, prohibition, or certiorari. They have original and general jurisdiction of all matters at law where the amount in controversy exceeds $50, and hear appeals from the county courts. In each county there is a county court composed of a president and two justices of the peace. It holds six sessions a year, two of which are limited to matters connected with the police and fiscal affairs of the county. The president is elected by the voters of the county for four years. Justices of the peace are also elected by popular vote. United States courts are held at Clarksburg, Wheeling, Charleston, and Parkersburg. The constitution requires that taxation shall be equal and uniform throughout the state, and that all property shall be taxed in proportion to its value; but property used for educational, literary, scientific, religious, or charitable purposes may by law be exempted from taxation. West Virginia is represented in congress by two senators and three representatives, and has therefore five electoral votes. —West Virginia is liable for a part of the debt of Virginia existing at the time of the division of the state, but neither the ratio nor the amount of the debt to be paid by West Virginia has yet been adjusted, although Virginia has set apart a third, amounting to about $15,000,000, as West Virginia's share. The state has no other public debt, and claims that on a fair settlement it should pay but $1,500,000 of the Virginia debt. The revenue of the state during the year ending Oct. 1, 1875, was $547,426, and the disbursements were $576,172. The balance in the treasury at that date was $253,618, distributed as follows: state fund, $14,459; general school fund, $207,186; school fund, $31,973. The assessed value of property in 1873 was: real, $99,486,189, personal, $39,865,240; in 1874, real, $99,688,203, personal, $41,102,588. In 1875 the value of real estate had increased to $110,922,030. The state tax in 1873 amounted to $648,104, including $339,995 for state purposes, $237,914 for schools, and $70,195 for public buildings. In 1874 the tax was $573,307, as follows: for state purposes, $330,002; schools, $242,981; public buildings, $324.—The state hospital for the insane, at Weston, was opened in 1864. The total number of inmates, Oct. 1, 1875, was 349. The average yearly cost of maintaining each patient was $125 18; total cost of the institution during the year, $69,310, of which $43,629 was for current expenses. The penitentiary, at Moundsville, on Oct. 1, 1875, had 105 convicts. The convicts are employed at various trades within the prison, but the institution is not self-sustaining. The state institution for the deaf, dumb, and blind, at Romney, was opened in 1870, and in 1875 had 5 instructors and 80 pupils, of whom 63 were deaf mutes and 17 blind. The current expenses of the institution are about $25,000 a year. There are accommodations for 120 pupils.—The supervision and management of the public schools are vested in a state superintendent elected by the people for four years; county superintendents elected for two years; district boards of education, each consisting of a president and two commissioners, elected for two years; district trustees; and county boards of examiners. The constitution prohibits the teaching of white and colored persons in the same school, and provision is made for separate schools for colored children. The school revenues are from the following sources: 1, annual interest on the invested school fund; 2, a uniform state tax of 10 cts. on the $100 valuation of all taxable property; 3, a state capitation tax of $1 on every male inhabitant over 21 years of age; 4, a distinct levy for a teachers' fund; 5, a distinct levy for a building fund. The last two levies are made or rejected by a vote of the people of each district. The condition of the public schools in 1873 and 1874 is shown by the following table:

PARTICULARS.	1873.	1874.
Number of school districts	329	321
" of subdistricts	2,411	2,845
" of schools	2,857	3,023
" of school houses	2,612	2,830
" of children between 6 and 21 years of age	171,793	173,462
Number attending school	81,100	110,530
Average daily attendance	61,244	69,908
Number of teachers	3,082	3,342
Average number of months schools open	3·86	4·12
Value of school property	$1,401,655	$1,540,460
Total school revenue	$748,064	$740,938
Total schcol expenditures	$606,691	$704,767

The state normal school, established by the legislature in 1867 at Marshall college, is now at Huntington; it was opened in 1868. Five branches have been established, viz.: at Fairmont, 1869; West Liberty, 1870; Glenville, 1873; Shepherdstown, 1873; and Concord. These schools are under the general supervision of a board of regents; they are maintained by the state, and are open to students free of charge for tuition, on condition that they will teach for a specified time in the schools of the state. In 1875–'6 there were 3 instructors and 80 students in the school at Huntington, 5 instructors and 161 students at Fairmont, 3 instructors and 26 students at West Liberty, and 5 instructors and 137 students at Shepherdstown. The West Virginia university, at Morgantown, opened in 1867, is under the general supervision of a board of nine regents. This institution has received the proceeds ($90,000) of West Virginia's share of the lands granted by congress in 1862 for the establishment of colleges of agriculture and the mechanic arts. The citizens of Morgantown contributed to its establishment about $50,000 in grounds, buildings, and money. The endowment has been increased to $110,000 by the legislature, which also makes annual appropriations. The university embraces six departments, viz.: 1, preparatory; 2, literary, covering a four years' course of studies arranged in nine schools, upon the completion of which the degree of bachelor of arts is conferred; 3, scientific, affording a four years' course in eight schools, and leading to the degree of bachelor of science; 4, agricultural, with a two years' course; 5, military; 6, engineering. There is also an elective course for those unable to graduate in any of the regular departments. A normal class for the benefit of teachers is formed every spring. In 1874–'5 there were in the university 11 instructors and 125 students. The institution has a library of about 4,000 volumes, valuable scientific apparatus, and a museum of natural history. Bethany college (Disciples'), at Bethany, opened in 1841, in 1875–'6 had 7 instructors and 125 pupils. West Virginia college (Freewill Baptist), at Flemington, opened in 1868, has normal, preparatory, and college departments; in 1875–'6 there were 7 instructors and 75 students. Storer college (Freewill Baptist), at Harper's Ferry, has primary, normal, and academic departments. It was opened in 1867, and in 1875–'6 had 10 instructors and 130 students. St. Vincent's college is a Roman Catholic theological seminary in Wheeling. Chief among the institutions for the advanced instruction of women are the Wheeling female college and the Parkersburg female academy of the Visitation (Roman Catholic).—The total number of libraries in 1870 was 1,728, having an aggregate of 372,745 volumes. Of these, 1,090 with 220,562 volumes were private, and 638 with 152,183 volumes other than private. The state library in Wheeling in 1876 contained 7,000 volumes. The number of newspapers and periodicals was 59, having an aggregate circulation of 54,432 and issuing annually 4,012,400 copies. There were 4 daily, with a circulation of 5,192; 2 tri-weekly, 550; 48 weekly, 42,390; 2 semi-monthly, 3,100; and 3 monthly, 3,200. The total number in 1875 was 75, of which 6 were daily, 2 tri-weekly, 1 semi-weekly, 61 weekly, 1 bi-weekly, and 4 monthly.—There were 1,529 religious organizations in 1870, having 1,018 edifices, with 297,315 sittings and property valued at $1,835,720, as follows:

DENOMINATIONS.	Organizations.	Edifices.	Sittings.	Property.
Baptist, regular	802	205	58,400	$191,805
" other	23	18	4,450	9,050
Disciples	4	1	250	600
Episcopal, Protestant	21	19	7,355	166,500
Evangelical Association	2	1	300	1,000
Jewish	1	..	......	....
Lutheran	22	21	7,300	93,300
Methodist	879	552	152,865	723,015
Presbyterian, regular	87	76	27,320	328,050
" other	2	..	......	....
Reformed Church in the United States (late German Reformed)	2	2	600	15,000
Roman Catholic	40	37	16,800	221,950
Second Advent	8	..	......	....
United Brethren in Christ	94	52	13,800	42,450
Universalist	4	1	300	1.000
Unknown (union)	11	11	1,425	5,050

—On April 22, 1861, nearly 1,200 citizens assembled in Clarksburg, in the W. part of Virginia, denounced the action of the Richmond convention in passing the ordinance of secession, and recommended the people of N. W. Virginia to meet in convention in Wheeling, May 13. Similar meetings were held elsewhere, and delegates from 25 western counties met in Wheeling and passed resolutions denouncing the ordinance of secession and providing for a convention of all the counties of Virginia adhering to the national government. An election of delegates having been held on the 26th, the convention, representing 40 counties, assembled in Wheeling on June 11, repudiated the acts of the convention and authorities in Richmond, and on the 20th elected as governor of the "reorganized state of Virginia" Francis H. Peirpoint, who at once entered upon the duties of that office. A lieutenant governor, an attorney general, and an executive council of five were also appointed. The legislature assembled in Wheeling on July 2, elected two United States senators, and on Aug. 20 passed an ordinance providing for an election to be held on Oct. 24 to decide upon the formation of the new state of Kanawha. The people by a large majority declared in favor of this measure. At the same time delegates were chosen to a constitutional convention, which assembled in Wheeling on Nov. 24, and framed a constitution, which was ratified by the people on May 3, 1862. On May 13 the consent of the legislature was given for the formation of the new state, the name of which had been changed on Dec. 3, 1861, to West Virginia. By an act approved Dec. 31, 1862, congress provided for the admission of West Virginia into the Union, upon the ratification by the people of the proposed amendment to the constitution abrogating its provision that no slave or free colored person should come into the state for permanent residence. This amendment was ratified, March 26, 1863, and on April 20 President Lincoln issued a proclamation declaring that the prescribed conditions had been complied with, and that the constitution should go into force in 60 days from that date. The state then comprised 48 counties; four new ones have since been organized. The subsequent admission of the counties of Berkeley and Jefferson was contested by Virginia, but a decision has been rendered by the supreme court of the United States in favor of West Virginia. State officers were elected on May 28, and on June 20 the state government was formally inaugurated, with A. I. Boreman as governor. Gov. Peirpoint now transferred the reorganized government of Virginia to Alexandria, Richmond being still under confederate control. The seat of government of West Virginia was in Wheeling until April, 1870, when Charleston, pursuant to an act of the legislature of Feb. 26, 1869, became the capital. In 1875 Wheeling was again made the capital. A new constitution was framed in 1872, and ratified by the people on Aug. 22.—Military operations in what is now West Virginia were, with few unimportant exceptions, confined to the year 1861. Gen. McClellan assumed command of the federal forces there early in the summer, and in July was succeeded by Gen. Rosecrans. The confederates were driven from the state after numerous engagements during the summer and autumn, the most important being those at Philippi, Beverly, Rich mountain, Cheat mountain, and Carnifex ferry. During the war West Virginia furnished to the federal army 30,000 troops, equivalent to 27,650 for three years. (See supplement.)

WETMORE, a S. E. county of Dakota, recently formed and not included in the census of 1870; area, about 700 sq. m. It contains two small lakes, forming the source of Smith creek, which flows into the Missouri.

WETTE, Wilhelm Martin Leberecht de. See De Wette.

WETTSTEIN, or **Wetstein, Johann Jakob,** a Swiss scholar, born in Basel, March 5, 1693, died in Amsterdam, March 23, 1754. He became a minister of the national church in 1713, travelled over Europe to examine various manuscripts of the New Testament, and in 1730 published *Prolegomena ad Novi Testamenti Græci Editionem accuratissimam.* He was denounced before the council of Basel as an innovator by persons who feared that the received text of the New Testament would be unsettled, and deposed from his ministry, and a decree was issued against his projected new edition. He retired to Amsterdam, and the Remonstrants or Arminians appointed him professor of philosophy and history. The decree of the council of Basel was reversed in May, 1733. His edition of the New Testament, with a critical commentary, was published in 1751–'2 (2 vols. fol., Amsterdam). The readings which he preferred were first embodied in the text of the London edition, published in 1763. Griesbach used his annotations.

WETZEL, a N. county of West Virginia, bordering on Pennsylvania, and bounded N. W. by the Ohio river; area, 360 sq. m.; pop. in 1870, 8,595, of whom 11 were colored. The surface is very hilly and the soil fertile. Iron ore, bituminous coal, and limestone are found in abundance. The county is traversed along the N. E. border by the Baltimore and Ohio railroad. The chief productions in 1870 were 37,170 bushels of wheat, 193,111 of Indian corn, 66,122 of oats, 19,209 of potatoes, 119,393 lbs. of butter, 23,392 of wool, 47,850 of tobacco, and 2,947 tons of hay. There were 1,629 horses, 3,864 cattle, 9,545 sheep, and 5,595 swine. Capital, New Martinsville.

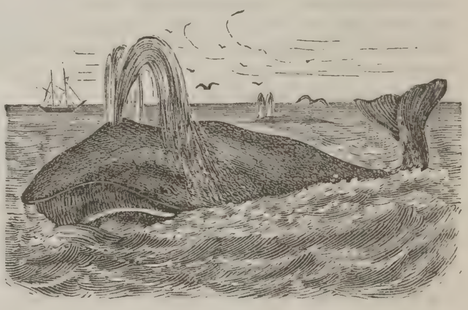
WEXFORD, a N. W. county of Michigan, drained by the Manistee river and its tributaries; area, 625 sq. m.; pop. in 1870, 650; in 1874, 3,011. The surface is diversified by prairie and woodland, and is interspersed with several small lakes, the principal of which are the Otisgo lakes in the S. E. part. The chief productions in 1870 were 4,806 bushels of wheat, 2,585 of Indian corn, 8,190 of potatoes, and 242 tons of hay. There were 44 horses, 77 milch cows, 148 other cattle, and 53 swine. Capital, Sherman.

WEXFORD. I. A S. E. county of Ireland, in the province of Leinster, bordering on Wicklow, St. George's channel, Waterford, Kilkenny, and Carlow; area, 896 sq. m.; pop. in 1871, 132,506. The N. E. part of the coast is low, faced by sand banks, and has no harbors, but the S. E. and S. shores are indented by several bays and havens. The surface rises toward the N. W. and becomes mountainous, but the S. E. portion is level. The chief rivers are the Slaney, with its tributaries the Derry and Bann, and the Barrow. The soil is mostly clayey and not very fertile. Oats, wheat, barley, and potatoes are the principal crops; dairy farming is carried on to a considerable extent. Woollen cloths and coarse linens are manufactured. The chief town, besides the capital, is New Ross. **II.** A seaport town, capital of the county, 72 m. S. by W. of Dublin, on the S. bank of the Slaney, at its entrance into Wexford harbor; pop. in 1871, 12,077. It has a Roman Catholic college and a museum of natural history. The manufacture of malt is carried on, likewise the herring, oyster, and salmon fisheries. The number of vessels entering the port in 1873 was 705, tonnage 62,883; cleared, 363, tonnage 38,020; vessels registered in 1873, 97, tonnage 7,927. Four newspapers were published in 1874.

WEYER'S CAVE, a stalactite cavern in the N. E. part of Augusta co., Va., about 18 m. E. by N. of Staunton, ranking next to Mammoth and Wyandotte among similar caves in the United States. It derives its name from Bernard Weyer, who discovered it while hunting about 1804. It is situated in a spur of a range of small mountains that branches out S. W. from the Blue Ridge. The entrance, having been enlarged, is about 7 ft. in height. The cave contains a number of apartments, beautifully adorned with stalactites and stalagmites and other objects of interest. Washington's hall, the largest chamber, is upward of 90 ft. high and 250 ft. long. Within a few hundred yards is Madison's cave, of inferior interest.

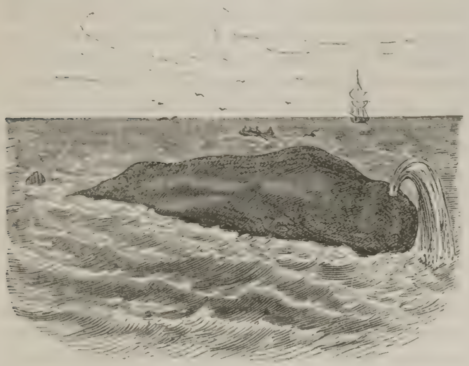
WEYMOUTH, a town of Norfolk co., Massachusetts, on Boston harbor, 12 m. S. S. E. of Boston by the South Shore railroad; pop. in 1870, 9,010; in 1875, 9,819. The N. part is a peninsula between two friths called Fore and Back rivers. The town, which is 3 by 9 m. in extent, contains four post villages, viz.: Weymouth, East Weymouth, North Weymouth, and South Weymouth. The chief industry is the manufacture of boots and shoes, which employs several large establishments. There are also two fan factories, employing from 75 to 100 hands each, a nail factory, phosphate works, ship yards, a tack factory, an isinglass factory, and a manufactory of fireworks. There is a considerable trade in lumber, coal, and grain. The town contains a large town hall, two national banks, three savings banks, an insurance company, 23 school houses, with graded schools and two high schools, a weekly newspaper, and 15 churches.

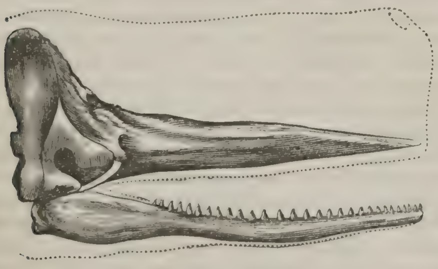
WHALE, the popular name of the typical or carnivorous cetacean mammals, with fish-like forms, embracing the families *balænidæ* or baleen whales, *physeteridæ* or sperm whales, and *delphinidæ* or dolphins (including besides the dolphins the porpoises, grampus, and narwhal, described under their respective titles). The first two families are of enormous size, with a disproportionately large head, the body tapering posteriorly and ending in a broad tail whose flukes extend horizontally; this tail, the principal organ in swimming, and especially in coming to the surface for respiration, is supported on a firm cartilaginous basis, having neither bones nor caudal rays; the anterior limbs are converted into fins, enclosed in a uniform skin, but containing the usual bones of the vertebrate arm, though much shortened and with more numerous phalanges; the sacrum and posterior limbs are wanting, the only traces being a pair of V-shaped pelvic bones, suspended among the muscles and detached from the spine; V-shaped bony arches extend from the upper caudal vertebræ, gradually growing smaller toward the end of the tail. The cranium is very small, the chief bulk of the head being made up of the facial bones; though the cervical vertebræ are evident in the skeleton, generally consolidated with the exception of the first, there is externally no trace of neck; the nostrils open on the top of the head, by a double or single foramen, constituting the blow-holes or spiracles, for respiration and the expulsion of water, and not for the exercise of smell; there is no external ear, and the auditory opening is extremely small to prevent the undue access of water; air penetrates into the large Eustachian tubes through the blow-holes, permitting the appreciation of sounds both in the water and in the air; the eyes are small, and apparently very far back on account of the development of the face. The head forms one quarter or one third of the total length of the body, and the skull is usually unsymmetrical, the right side being larger than the left; the petrous portion of the temporal bone is attached to the skull by cartilage; the mouth is very wide, and the jaws are armed with plates of whalebone or numerous conical teeth. The skin is naked, with the exception of a few bristles about the jaws, and beneath it is a thick coating of fat or blubber, preserving the temperature of the body and reducing its specific gravity, and affording the oil for which these animals are chiefly pursued. The older naturalists regarded the blubber as subcutaneous, but more recent observations show it to be a part of the true skin, the fibres forming an open network in which the fat is held. The skin is infested with parasites, especially the crustacean *cyamus ceti* (Lam.) or whale louse, and barnacles and mollusks are often found attached to the sperm whale and rorqual. The flesh is red, firm, and coarse; the bones are less compact than in terrestrial mammals, and without medullary cavity. During respiration the conical larynx projects upward into the posterior nares, and is closely embraced by the muscles of the soft palate, opening a free passage from the lungs externally through the blow-holes, even though the whole head be submerged and the mouth filled with water. In the expulsion of water (which is denied by some and admitted by others), it is forced into the nasal cavities while the animal performs the act of swallowing, the pharynx being closed to prevent its passage beyond the proper point, and the forcible contraction of the muscles surrounding the passages sends it out in a jet; expiration, carrying with it a jet of vapor, is performed in a similar manner. Though all are carnivorous, the stomach has from three to six compartments. In order to provide a constant supply of arterial blood during submersion, there are plexuses of arteries within the chest near the spine. (See Dolphin.)—The whales embrace the largest of living animals, and have been known in all ages, but were generally and naturally enough regarded as fishes even by naturalists to the time of Linnæus; they are, however, true mammals, warm-blooded, air-breathing, bringing forth their young (usually one) alive, and suckling them for a considerable period by means of two abdominal mammæ. They mostly occur in large shoals in the arctic and antarctic seas, and are often seen sporting on the surface of the ocean; that the pectorals are not locomotive organs, but balancers and rudders, might be supposed from their small size when compared with the tail; when life is extinct they fall over on the back; the young are also held by these limbs.—In the *balænidæ* or baleen whales there are no teeth in the adult, but there are in the embryo, though from the early ossification and coalescence of the groove in which they lie, they do not come into view; the mouth is provided with numerous plates of the horny substance well known as whalebone or baleen; along the centre of the palate runs a strong ridge, and on each side of this a wide depression along which the plates are inserted; these are long and flat, hanging free, placed transversely, with their sides parallel and near each other; the base and outer edge are solid whalebone, but the inner edge is fringed, filling up the interior of the mouth and acting as a strainer for the food, which consists chiefly of the small swimming mollusks and medusæ or jelly fishes. The baleen rarely, if ever, swallows anything larger than a herring; shoals of these small creatures are entangled in the fibres of the baleen, the water which does not escape by the mouth being expelled by the blow-holes; though the cavity of the mouth is large enough to contain a ship's long boat, the opening of the gullet is not larger than a man's fist. The lower jaw has neither baleen nor teeth, but has large fleshy lips, within which the upper is received when the mouth is closed. In the genus *balæna* (Linn.) there is no dorsal fin; the baleen whales with a dorsal fin have been described under Rorqual. The right or Greenland whale (*B. mysticetus*, Linn.) attains a length of 60 to 70 ft., the tail being 5 or 6 ft. long and 20 to 25 ft. wide; the general color is blackish above and grayish white below; pectorals 8 to 9 ft. long and 4 or 5 ft. wide; the mouth is 15 or 16 ft. long, 6 to 8 ft. wide, and 10 to 12 ft. high inside, presenting a sigmoid curve when shut; the eyes are not larger than those of an ox, with a white iris, and placed about a foot obliquely above and behind the angle of the mouth; the tongue is soft, thick, fatty, and very slightly movable; the tail is of immense power. The ordinary rate of progress is 4 or 5 m. an hour; they swim not far beneath the surface, and throw themselves in sport entirely out of water; they are fond of immersing the body perpendicularly and flapping the tail on the surface, making a sound heard for 2 or 3 miles; they usually come up every 8 or 10 minutes, but can remain down half an hour or more; they generally keep on the surface about two minutes, during which they blow eight or nine times, and then descend; they feed swimming just below the surface, with the mouth wide open. They are found in most parts of the arctic seas. Gestation has been variously placed at 9 to 15 or 18 months; the young measures at birth 10 to 14 ft. in length, and is tenderly cared for by the mother for a year or more; during nursing they gently roll from side to side horizontally, so that each in turn may have an opportunity to breathe; the young furnish but little oil, and are never struck by the harpoon unless to capture the mother by means of her affection for her progeny. According to Prof. J. Wyman, in an embryo 6 in. long, the tail was rounded as in the manatee, with a vertical crest above and below it, and the thymus gland very large, almost enveloping the heart. The southern or Cape whale (*B. australis*, Desmoulins) attains a length of 50 or 60 ft., and has a relatively smaller head than the northern species; it inhabits the southern ocean, generally near the coast, and in comparatively shallow water; it goes up the Pacific even to Japan and Kamtchatka, the Atlantic as far as the United States, and all along the African coasts; it is hunted in summer, when the shoals come near the shore to produce their young; the principal fisheries are about New Zealand and S. Africa.—The family *physe-*



Right Whale (Balæna mysticetus).

teridæ or *catodontidæ*, or the sperm whales, have no baleen plates, but 40 to 50 conical teeth in the lower jaw with internal cavities; this is shorter and narrower than the upper, and completely enclosed by it when the mouth is shut; the teeth fit into cavities in the upper jaw, which has some rudimentary teeth concealed in the gums; the head is of enormous size, one third the whole length of the body, nearly cylindrical, truncated in front with a single *f*-shaped blow-hole in the anterior margin of the snout; the greater part of the bulk of the head is made up of a cartilaginous envelope or "case," containing an oily fluid hardening on exposure to the air, and well known as spermaceti; there is a false fin or protuberance on the hind part of the back. The old genus *physeter* (Linn.) has been variously subdivided by modern authors, and not always on what seem sufficient grounds. The best known and largest of the sperm whales is the *P. macrocephalus* (Shaw), or blunt-headed cachalot of the whalemen; it belongs to the genus *catodon* of Lacépède. The males attain a length of 60 to 75 ft., and the females are about half as long; the color is blackish and greenish gray above, whitish beneath and about the eyes. The skeleton is very similar to that of the dolphin, except in the head; the cervicals are 7 and united except the first, dorsals 14 or 15 with as many pairs of ribs, and the other vertebræ 38 to 40, with strong processes and of nearly the same size to within seven or eight of the end; the pectoral limbs are 4 to 6 ft. long and 2 to 3 ft. wide; dorsal protuberance about 2 ft. high, and blow-hole about a foot long; eyes larger than in the right whale, and tongue thick and soft; mammæ about a foot in diameter, concealed in folds of the skin, with a nipple several inches long; the mouth is immense, and the gullet is capable of swallowing an object as large as a man. They are distributed in all seas, but principally in those of the southern hemisphere, living in deep water and very rarely approaching land; they are usually seen in companies of 20 to 50 females and young, with one or two old males or bulls; they feed chiefly on cuttle fishes and other cephalopodous mollusks abundant in the southern seas; the males fight savagely, as their distorted and broken jaws fully testify. Inspiration must be very quickly performed, as the nose is rarely out of water more than a few seconds at a time; they make 60 or 70 respirations while remaining about 10 minutes at the surface; when the spoutings are over, if undisturbed they descend, remaining down from half an hour to an hour. They are eagerly hunted, as their oil is the finest for burning, and the spermaceti valuable for the manufacture of candles and for medical purposes; ambergris, highly prized in the making of perfumery, is also a product of the intestines of the sperm whale; the blanket or blubber of a single individual will yield 80 or more barrels of oil; the spermaceti is contained in tendinous compartments communicating with each other, and the product of a single one is sometimes more than a ton; as a rough estimate, the yield of spermaceti is about one fifth that of oil. Though naturally timid, it is more dangerous to attack than the baleen whale, both the tail and teeth being used as offensive weapons, and a whole shoal sometimes coming to the assistance of a wounded comrade; the stoutest ship will spring a leak after being struck by the head of one of these immense creatures. Other smaller species are found in the northern seas.—The beluga or white whale, and the deductor or *globicephalus*, have been described under DOLPHIN. The diodons have no teeth in the upper jaw, only two in the lower, a depressed forehead, and the lower jaw much larger than the upper; a rare species is found in the Mediterranean, 15 or 16 ft. long. The hyperoödon or bottle-nosed whale of Honfleur has a rounded and prominent forehead, a short and strong beak; it is rare, and attains a length of 20 to 25 ft. In the aodon or toothless whale of Havre, the body is fusiform, with a distinct appearance of neck, jaws prolonged into a cylindrical beak without teeth; it attains a length of 15 to 20 ft., is very rare, and seems to connect the whale with the dolphin family.—Fossil whales have been found in the upper tertiary and the diluvial formations of America and Europe; their remains have been obtained in the Green mountains near Lake Champlain, 60 ft. above the lake and 150 ft. above the sea,


Sperm Whale (Physeter macrocephalus).


Skull of Sperm Whale.

in clay strata, one of the great number of proofs of an ancient distribution of land and water upon this continent very different from the present, and of remarkable changes of level. —The grampus, a cetacean of the dolphin family, is generally called the killer, from the belief, probably well founded, that it attacks the baleen whale in herds, biting it to death.

WHALEBONE, or **Baleen,** the horny laminated plates or blades in the mouth of the *balæna* or right whale. These plates, which number about 300 in the mouth of a full-grown animal, are from 10 to 15 ft. long, and serve the purpose of retaining the small fry which compose the food of the right whale. The whalebone is not properly bone, but bears a strong resemblance to the horns of cattle, the hoofs of the horse, or the nails and hair of the human species. It is almost identical in structure with the horn of the rhinoceros. Three kinds are distinguished in commerce, though there is little difference in the quality: the Greenland, the South sea, and the N. W. coast bone. It is used for the ribs or stretchers of umbrellas and parasols, for stays, brushes, whip handles, the manufacture of hair cloth, for hats and bonnets, canes, and other articles. The increasing price has led to the substitution for it of steel, vulcanite, and rattan.

WHALE FISHERY, the pursuit of whales for their oil or whalebone. In the United States the principal whaling ports are New Bedford and Provincetown, Mass., and New London, Conn. The business as now conducted requires a large amount of capital, the sperm whale fishery needing more than that of the right whale. A whale ship once saturated with oil does not rot; and in several of the whaling ports vessels are still in use which were built half a century ago. They seldom measure over 500 tons, and the average of those in the business on Jan. 1, 1876, was 230 tons. The outfit for a whale ship is from four to seven boats of peculiar construction, to each of which is assigned its crew, with casks for oil and apparatus for taking whales and trying them out. The crew is divided into boats' crews of five or seven. Each man, from the captain to the cabin boy, has an interest in the future cargo, called a "lay." With the common sailors this is from $\frac{1}{125}$ to $\frac{1}{170}$, or if the vessel is large $\frac{1}{190}$ of the proceeds of the cargo. The boat steerers receive from $\frac{1}{95}$ to $\frac{1}{125}$, according to the size of the vessel, and the higher officers more. The voyage of a sperm whaler usually lasts three or four seasons or years; that of a right whaler one or two seasons, and occasionally, if luck is poor, three seasons. The implements used for the capture of the whale are the harpoon, the lance, and the harpoon gun. The harpoon is a heavy barbed iron, very sharp on the cutting edges, having a shank partly of wood 2½ or 3 ft. in length, and attached to a strong rope carefully coiled in a tub; it is hurled by the boat steerer. The lance is a long spear-like instrument, the head oval, and the blade 5 or 6 in. long and 2½ to 3 in. wide, not very thick, but with keen cutting edges, the shank fitted with a long wooden handle; it is used only when the whale rises, and is thrust if possible into a vital part. The harpoon gun hurls the harpoon by the force of powder instead of muscle; all ships carry bomb guns, from three to ten each. When the ship arrives in the vicinity of a whaling ground, a lookout is stationed at the masthead. As soon as a whale is discovered, the boats are lowered, and each crew exerts its utmost strength to reach the whale first. In the bow sits the boat steerer or harpooner with his tub at his feet. At the proper moment he seizes the harpoon in his right hand and the coil of rope in his left, and, as the bow of the boat touches or nears the whale, hurls his harpoon with all his force, aiming at a vital point, and crying, "Stern all." The crew instantly back the boat, and the whale in its terror plunges below the surface, and dives with such velocity that water must be constantly poured upon the line to keep it from setting the boat on fire by its friction. The line, often 100 fathoms in length, is soon exhausted, and a second attached, and sometimes a third. The whale stays under water from 20 to 60 minutes, and when it rises the boats hasten to it and again strike it with the harpoons, and it descends again, usually striking as it goes down with its formidable tail in the hope of destroying its foes. It stays below the surface but a short time, and on rising again spouts bloody water or blood alone through its blow-holes. The boats again approach and endeavor to lance it in a vital point. If they are successful, it sometimes turns upon its side or back and dies quietly; oftener its death struggle is terrific, the water being dyed with blood and beaten into foam. If it dies upon the surface, its body can be secured; but if in its last agonies it again descends, the body sinks, and does not rise perhaps for months, if at all. In this way almost every whale ship loses some of its game. The sole weapon of defence of the right whale is its tail, a blow from which would crush the stoutest boat like an egg shell. But the sperm whale, while its tail is equally formidable, can stave in a ship's side with its snout, or crush a boat in its mouth. Its power of running is also superior, and its ability to remain below the surface greater. The whale when captured is towed to the ship, and made fast to the side by chains. A part of the crew with cutting spades descend to the platform rigged over the ship's side, cut into the blubber and loosen one end of the strip from the whale, while one of their number is lowered to attach to it one of the immense hooks which are fastened to the masthead, and the remainder of the crew hoist it to the deck, the cutters aiding with their spades in severing the skin as broad strips 20 or 30 ft. long are hoisted in. The carcass of the whale is rolled over and over till entirely stripped of blubber. These masses of blubber on reaching the deck are cut up in square pieces and placed in the blubber room between decks to await the process of trying. Before the right whale is thus stripped, others of the crew are lowered into its mouth and remove the baleen or whalebone, which, if the animal is of average size, weighs nearly a ton. When stripped of its blubber and whalebone, the carcass is cast off, and the flesh is stripped off by the sharks, bears, and vultures. The reservoir of sperm oil and spermaceti in the head of the sperm whale must be secured by cutting off the head, which constitutes one third the length. The men lay bare the vast cistern and fill the buckets, eventually descending into the cavern, where there is often room for two full-grown men in a single compartment, and for eight or ten in all, and scoop up the half liquid mass till the cavity is completely emptied. This is sometimes done before and sometimes after the blubber is stripped off from the remainder of the carcass, which is done as in the case of the right whale. In all whale ships the process of "trying out" the oil is performed on board. After the first try pot is strained, the scraps or cracknels (the cellular tissue from which the oil has been expressed) serve for fuel, and the process is continued with abundant smoke, soot, and grease, till the whole blubber has been tried, and the casks not filled with oil are ready for the results of another catch.—The whale fishery in the United States has been falling off for the last 20 years. Its decline had commenced earlier in Europe, but the deficiency of the receipts from European whaling ships was made up by imports of oil, bone, and spermaceti from the United States. Among the causes of the decline are the scarcity of whales from their being so constantly hunted; the increasing use of gas and mineral oils, and the production of stearine and paraffine; and the substitution of steel for whalebone in many articles of clothing, umbrellas, parasols, and the like, and of hard rubber or vulcanite in other cases. In 1830 there were 102,000 tons of shipping engaged in the whale fishery from United States ports, of which 62,000 were in the sperm and 40,000 in the right whale fishery. About 8,000 seamen were engaged in it. The products of the fishery for that year were 106,800 bbls. of sperm oil, 115,000 bbls. of whale oil, and 120,000 lbs. of whalebone; and 2,500,000 lbs. of sperm candles were made. In 1840 the tonnage employed had increased to 137,000. In 1850 it was 171,484. The number and tonnage of vessels were greatest in 1854, viz.: 602 ships and barks, 28 brigs, and 38 schooners, with a total tonnage of 208,399. On Jan. 1, 1860, there were 569 vessels, tonnage 176,842; on Jan. 1, 1865, 276 vessels, tonnage 79,690; on Jan. 1, 1870, 321 vessels, tonnage 73,137; on Jan. 1, 1875, 163 vessels, tonnage 37,733. The number and tonnage of vessels engaged in whaling on Jan. 1, 1876, with the ports to which they belonged, were as follows:

PORTS.	Ships and barks.	Brigs.	Schooners.	Tonnage.
New Bedford, Mass....	110	2	4	81,691
Fairhaven, "	...	..	2	156
Dartmouth, "	2	..	..	443
Westport, "	3	..	..	771
Marion, "	...	..	2	176
Edgartown, "	2	..	..	338
Provincetown, "	...	1	18	1,804
Boston, "	1	3	3	792
New London, Conn.....	3	1	10	2,320
New York, N. Y.......	1	..	..	152
San Francisco, Cal......	1	..	..	245
Total..............	123	7	39	88,888

Of these 169 vessels, 137 were at sea. The products of the fishery imported at different periods have been as follows:

YEARS.	Sperm oil, barrels.	Whale oil, barrels.	Whalebone, lbs.
1851	99,591	328,483	3,966.500
1853	103,077	260,114	5,652,300
1860	73,708	140,005	1,337,650
1870	55,183	72,691	708.365
1875	42,617	84,594	372,303

The imports of whale oil attained their maximum in 1851, and those of sperm oil and whalebone in 1853. The value of the products of the national whale fishery imported during the year ending June 30, 1875, was $2,841,002. The distribution of the whaling fleet for 1876 is estimated as follows: N. and S. Atlantic, 77 vessels; Indian ocean and New Holland, 15; New Zealand, 13; Pacific coast and off-shore ground, 23; N. Pacific, 18; Cumberland inlet, 4.—The whale fishery in Great Britain, once of considerable magnitude, has of late years been almost entirely abandoned. In 1833 there were 129 ships engaged in it, and the value of the products received was £437,283. In 1842 the number of ships was 75, and the value of products £364,680. There are now 10 or 15 steamers from Dundee and a few from two or three other ports employed in the Greenland seas in the prosecution of the seal and whale fisheries, chiefly the former. France in 1837 had 44 ships engaged in the whaling business, measuring 19,128 tons, and with crews numbering 1,615 men. In 1868 she had only three ships. Holland, which was once largely interested in this fishery, has entirely abandoned it. Whales have recently been pursued in steamers from a small island in the Varangar fiord on the coast of Norway. They are struck with harpoons discharged from a cannon, and when secured are towed back to the island. According to the latest returns, 9 vessels of 2,220 tons were employed in whaling from New South Wales, and 16 of 4,088 tons from Tasmania.—The whale fishery has been prosecuted for more than 600 years. The bay of Biscay in the 12th, 13th, and 14th centuries swarmed with one of the smaller species of whale, probably either the *beluga* or *globicephalus*, and the Biscayans became adepts in their capture. After the discovery of America, the voyages of English and Dutch explorers to the northern seas led to the discovery of the northern haunts of the *balæna* or great "right" whale, and the Dutch entered largely into the whale fishery. Great numbers were found in the vicinity of the island of Spitzbergen, and the Dutch erected a considerable village, which they named Smeerenberg (*smeeren*, to melt), on the coast of that island as a resort for their ships for boiling the blubber. After some years the whales abandoned the shores of Spitzbergen and were found on the Greenland coasts, and the Dutch ships brought the blubber home. In 1680 they had 260 ships and about 14,000 sailors engaged in this fishery; but from that time their traffic in oil began gradually to decline. England attempted to take the place which Holland had occupied in the fishery, but with slight success. In 1815, when the fishery was at its height, there were only 164 ships engaged in it. The New England colonies embarked in this fishery at an early period. In 1690 and for 50 years later it was prosecuted in boats from the shore, the whale being a frequent visitor of the coasts and bays of New England. In 1740, the whales having abandoned the coast, the fishermen followed them in larger vessels and to the arctic and antarctic coasts. In 1758, and for several years subsequently, Massachusetts alone employed 304 vessels, measuring about 28,000 tons, in the northern and southern whale fisheries. At first the whalers' attention was turned to the capture of the right whale, but in 1712 Christopher Hussey of Nantucket, being driven off shore, fell in with and killed a sperm whale, and within a few years the Nantucket fishermen were equally ready to capture one as the other. That island, Martha's Vineyard, and Cape Cod monopolized the business till shortly before the revolution, when New Bedford, now the largest whaling port in the world, began sending out whale ships. Nantucket long held the supremacy as a whaling port, but the business there has now entirely ceased.—See "Etchings of a Whaling Cruise," by J. Ross Browne (New York, 1846); "The Whale and his Captors," by H. T. Cheever (1850); "Moby Dick, or the White Whale," by Herman Melville (1855); "The Whale Fishery" (1855); and "Whaling and Fishing," by Charles Nordhoff (Cincinnati, 1857).

WHARTON, a S. E. county of Texas, bounded N. E. by the San Bernard river, and intersected by the Colorado; area, 1,094 sq. m.; pop. in 1870, 3,426, of whom 2,910 were colored. The surface is generally level, and the soil highly fertile. The Galveston, Harrisburg, and San Antonio railroad crosses the N. part. The chief productions in 1870 were 143,900 bushels of Indian corn, 8,540 of sweet potatoes, and 1,217 bales of cotton. There were 667 horses, 563 milch cows, 4,672 other cattle, and 2,010 swine. Capital, Wharton.

WHARTON, Francis, an American author, born in Philadelphia in 1820. He graduated at Yale college in 1839, studied law, and settled in his native city. He was professor of English literature, jurisprudence, and history in Kenyon college at Gambier, O., from 1856 to 1863, when he was ordained a clergyman of the Episcopal church, and became rector of St. Paul's church in Brookline, Mass. In 1866 he became professor of homiletics and pastoral care in the Episcopal theological school, Cambridge, Mass., which office he still retains (1876). He has published a "Treatise on the Criminal Law of the United States" (Philadelphia, 1846; 6th ed., 3 vols., 1868); "State Trials of the United States during the Administrations of Washington and Adams" (1849); "Precedents of Indictments and Pleas adapted to the Use both of the Courts of the United States and those of the several States" (1849); "A Treatise on the Law of Homicide in the United States" (1855); "A Treatise on Theism and Skepticism" (1859); with N. Stillé, M. D., "A Treatise on Medical Jurisprudence" (1855; revised ed., 1860); "The Silence of Scripture, a Series of Lectures" (1867); "Treatise on the Conflict of Laws" (1872); and "The Law of Agency and Agents" (1876). He was for a time associate editor of the "Episcopal Recorder," Philadelphia.

WHARTON, Henry, an English clergyman, born in Worstead, Norfolk, Nov. 9, 1664, died in Newton, Cambridgeshire, March 5, 1695. He graduated at Caius college, Cambridge, in 1684, and in 1686 became assistant to Dr. William Cave in the compilation of his *Scriptorum Ecclesiasticorum Historia Literaria* (1688–'9). He was afterward appointed one of the chaplains of Archbishop Sancroft. His numerous works include *Anglia Sacra* (2 vols. fol., 1691), a collection of ecclesiastical biographies; "A Defence of Pluralities" (8vo, 1692); and a pamphlet criticising Burnet's history.

WHARTON. I. Thomas Wharton, marquis of, an English statesman, born about 1640, died in London, April 12, 1715. He was the eldest son of Philip, fourth Baron Wharton, with whom he was among the first to join William of Orange upon his arrival in England in 1688. He held several important offices under William, and subsequently was one of the commissioners for arranging the treaty of union with Scotland. He succeeded to his father's title in 1696, and in 1706 was created Viscount Winchenden and Earl Wharton; and he was also made a peer of Ireland as earl of Rathfarnham and marquis of Catherlough. In 1708 he was appointed lord lieutenant of Ireland, which office he held for two years, Addison being his secretary; and on the accession of George I. he was created marquis of Wharton, and lord privy seal in the Halifax ministry. He was throughout life a devoted whig, and unrivalled as a party manager, but notoriously immoral and unprincipled. According to Bishop Percy, he was the author of the famous Irish ballad of "Lillibulero." **II. Philip Wharton,** duke of, son of the preceding, born in December, 1698, died in Catalonia, Spain, May 31, 1731. At 16 years of age he married a woman far inferior in rank to himself, which so disconcerted his parents that they both died heart-broken, it is said, within a year. In conformity with his father's plans, however, he went in 1716 to Geneva to complete his education, but soon parted from his Calvinist tutor, and travelled to Avignon, where he received from the pretender the title of duke of Northumberland. He next went to Paris, where he borrowed from the widow of James II. £2,000, promising to employ it in the interest of the Jacobites. In the latter part of 1716 he took his seat in the Irish house of peers, and greatly distinguished himself as a debater. Within a year he was created duke of Wharton in the English peerage. In 1720 he took his seat in the English house of peers, where he soon threw the weight of his brilliant talents against the ministry. Within three years he became greatly involved by his extravagance; and early in 1724, having for several months edited a semi-weekly political paper called the "True Briton," he went to Vienna, and thence to Madrid. He soon made no secret of his adherence to the pretender, and at the siege of Gibraltar in 1727 he openly appeared as aide-de-camp to the count of Torres. The king of Spain made him colonel of an Irish regiment in the Spanish service, but in England he was attainted for high treason and dispossessed of the remnant of his property. The remainder of his life was passed in wandering. In 1732 appeared the "Life and Writings of Philip, late Duke of Wharton" (2 vols. 8vo), containing his "True Briton" papers and speech in defence of Atterbury; and there is another publication in 2 vols. 8vo, purporting to contain the poetical works of himself and his friends.

WHARTON, Thomas, an English physician, born in Yorkshire about 1610, died in London in 1673. He was fellow of the London college of physicians, and a lecturer in Gresham college. He is remembered principally by his discovery of the excretory duct of the submaxillary gland, known as "Wharton's duct." His chief publication was his *Adenographia, seu Descriptio Glandularum totius Corporis* (London, 1656).

WHATCOM, a N. W. county of Washington territory, bounded N. by British Columbia and W. by Washington sound, lying between the gulf of Georgia and the strait of Fuca; area, about 4,100 sq. m.; pop. in 1870, 534. It is watered by several streams. The coast is indented by Bellingham bay, near which is Lake Whatcom, and in the vicinity are coal mines. The interior is covered with dense forests, and the E. part is crossed by lofty and rugged mountains. Mt. Baker in this region is over 10,000 ft. high. Lumber is the principal source of wealth. The chief productions in 1870 were 1,275 bushels of wheat, 5,430 of oats, 1,686 of barley, 2,392 of peas and beans, 28,600 of potatoes, 30,210 lbs. of wool, 16,600 of butter, and 1,364 tons of hay. There were 131 horses, 617 milch cows, 1,485 other cattle, 10,070 sheep, and 1,634 swine. Capital, Whatcom.

WHATELY, Richard, an English prelate, born in London, Feb. 1, 1787, died in Dublin, Oct. 8, 1863. He graduated at Oxford in 1808, became a fellow of Oriel college in 1811, was appointed Bampton lecturer in 1822, and the same year became rector of Halesworth in Suffolk. In 1825 he was chosen principal of St. Alban's hall, Oxford, in 1830 was appointed professor of political economy at Oxford, and in 1831 was consecrated archbishop of Dublin and bishop of Glendalagh. He took an active part in establishing the "national system of education" in Ireland, and endowed the professorship of political economy in the university of Dublin. He resigned his connection with the board of Irish education in 1853. In theology he is reckoned one of the founders of the broad church party. His most important works are: "Historic Doubts relative to Napoleon Bonaparte" (London, 1819); "On the Use and Abuse of Party Feeling in Religion" (Bampton lectures, 1822); "The Christian's Duty with respect to the Established Government and the Laws" (1821); "Essays on some of the Peculiarities of the Christian Religion" (1825; new American ed., Andover, 1870); "Elements of Logic" (1826); "Elements of Rhetoric" (1828); "Essays on some of the Difficulties in the Writings of St. Paul," &c. (1828); "Introductory Lectures to Political Economy" (1831); "Introductory Lectures on the Study of St. Paul's Epistles" (1849); "English Synonymes" (1851); "Bacon's Essays, with Notes" (1856); "Scripture Doctrine concerning the Sacraments" (1857); "Introductory Lessons on Mind" (1859); "Introductory Lessons on the British Constitution" (1859); "Lectures on some of the Parables" (1860); "Lectures on Prayer" (1860); "General View of the Rise, Progress, and Corruption of Christianity, with a Sketch of the Author, and a catalogue of his Writings" (New York, 1860); and "Miscellaneous Lectures and Reviews" (London, 1861). His "Miscellaneous Remains" have been edited by Miss E. J. Whately (1864).

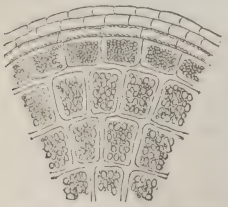
WHEAT (A.-S. *hwæte*, white, in distinction from rye and other dark-colored grains), a cereal, *triticum vulgare*, which has been cultivated from the earliest antiquity, and now furnishes the principal breadstuff in all civilized countries. The wheat genus, *triticum* (the classical name), belongs to the subtribe of grasses called *hordeineæ*, from barley, which is in structure closely related to wheat, and rye also belongs in the same division; all these have their one- to many-flowered spikelets on opposite sides of a zigzag jointed stem or rachis, which is excavated to form a notch at each joint. In *triticum* there is but a single spikelet at each joint, its two glumes placed transversely, and it is from three- to several-flowered; the lower palet is pointed, or furnished at the tips with an awn of variable length; stamens three. Besides the grain-producing species, all of which are annuals, there are several with perennial roots, which by some botanists have been placed in a distinct genus, *agropyron*, the most important of which is the troublesome *T. repens.* (See COUCH GRASS.) Wheat has a dense four-sided spike; the turgid spikelets are three- to five-flowered, with ventricose, blunt glumes; the palets awned or awnless, and the grain free from the upper palet, with a longitudinal furrow on one side, very turgid on the other, and hairy at the top. The spring and winter wheats, which have been sometimes described as distinct, are only forms produced by cultivation, as it has been repeatedly demonstrated that by a few years' successive growing spring wheat may be converted into the winter variety, and *vice versa.* Like other cereals, wheat is not certainly known in the wild state, and its origin has been the subject of much speculation; some suppose it to be a plant now extinct in the wild state, others that it is the cultivated form of what are now regarded as distinct wild species. De Candolle is disposed to accept the testimony of travellers who say they have found *T. vulgare* in various parts of Asia in localities where it was not likely to have escaped from cultivation. About 1855 M. Fabre asserted that he had established by experiment the fact that wheat was *ægilops ovata* (a common grass in southern Europe), developed by cultivation; he asserted that by successive sowings he had produced forms of *ægilops* which pass for species, and by continuing this course for 12 years produced perfect wheat. His experiments are not credited, as the grass is now known to have been accidentally or otherwise hybridized with wheat. The varieties of wheat are very numerous, one French experimenter having cultivated over 150, and another 322. The plant differs in stature, habit, and foliage, in the size and shape of the spike or head, the number of flowers in the spikelet, the shape and size of the floral envelopes, the presence or absence of a beard or awn and its character, and the size, form, color, and hairiness of the grain. So widely different are some of the varieties, which have retained their identity through centuries of cultivation, that some botanists think they must have originated from four or five distinct species; other kinds vary greatly with the character of the soil. The mention of wheat in the Old Testament, and its culture by the ancient Egyptians, are proofs of its antiquity, and Chinese history declares that it was introduced into China by the emperor Shin-nung about 2700 B. C.—The limit to the successful cultivation of wheat is not determined so much by the cold of winter as by the temperature of summer, 57·2° being the minimum mean temperature in which it will mature. The southern limits vary between 20° and 25° N. and S. latitude, though at a sufficient elevation it may be grown near the equator. Wheat is largely cultivated in most European countries; some which a few years ago were exporters do not now raise enough for their own consumption; the principal wheat-exporting countries at present, besides the United States, are Russia, Denmark, Hungary, Turkey, and Chili. In the United States wheat growing has regularly extended westward; in some of the older states an improvident course of agriculture exhausted the land until remunerative crops could no longer be raised; in the lack of a system of rotation the soil became stocked with the seeds of weeds, and the increase of destructive insects added to the difficulties which made it necessary to seek new land; but where better farming prevailed, the crop is still profitably grown. The new prairie soil of the western states allows the crop to be raised without the expense for fertilizers to which the eastern farmer is subjected, though this is in great measure offset by the cost of transporting western grain to market. The chief wheat-growing states and their production in 1873 were: Iowa, 34,600,000 bushels; Illinois, 28,417,000; Minnesota, 28,056,000; Wisconsin, 26,322,000; California, 21,504,000; Indiana, 20,832,000; Ohio, 18,567,000; Pennsylvania, 15,548,000; Michigan, 14,214,000; Missouri, 11,927,000; Tennessee, 7,414,000; Kentucky, 7,225,000; New York, 7,047,000; Virginia, 5,788,000; Maryland, 5,262,000; Kansas, 4,330,000; Nebraska, 3,584,000; Oregon, 3,127,000; North Carolina, 2,795,000; West Virginia, 2,657,000; Georgia, 2,176,000; and New Jersey, 1,948,000. The total production of the United States in 1874 was 309,102,700 bushels, from 24,967,027 acres, averaging 12·3 bushels to the acre. Nothing in the history of our agriculture is more striking than the remarkable increase of wheat growing on the Pacific coast, especially in California, where the crop in 1850 was only 17,200 bushels, most of the grain consumed being at that time brought from Chili. Both soil and climate are most favorable to its culture; 2,000 to 4,000 acres is a moderate size for a wheat farm, and those ten times as large are not rare. The climate is so rainless in summer that the bags of grain may be stacked up in the open field for weeks, without fear of injury.—Probably not more than a dozen varieties are in general cultivation in this country, though each is apt to have several local names, and a variety if long cultivated in one district may seem much unlike the same that has been grown for several years in a different locality. New sorts are frequently offered as superior in productiveness to all others; but every good farmer knows that the more productive the wheat, the better must be the soil. Spring wheat is sown and harvested the same year, while winter wheat is sown in autumn, usually in September, when it germinates, and the plant grows until stopped by cold weather; it re-

Winter Wheat—Bald and Bearded.

mains dormant during the winter, and renews its growth in the spring, ripening about midsummer. These groups are subdivided into white and red or amber varieties, and these again into bald and bearded wheat. Among the spring varieties, the China, also called tea wheat (as it is said to have come from a grain found in a box of tea), Mediterranean spring, and Canada club are leading kinds. Of winter wheats the white varieties are most esteemed; the most prominent of these are: the Diehl, bald and early ripening; the Clauson or Seneca, with a red chaff and white grain; Boughton (often called Oregon), white Michigan, white Mediterranean, and Soule's. Among the red or amber varieties are the red Mediterranean, one of the best for ordinary soils, the amber, the Fultz, the Witter, and others. Formerly spring wheats brought a lower price than the others, but since the recent introduction of what is called the "new process" of grinding, in which the grain is first deprived of its outer covering, they are preferred for some kinds of flour, and bring as much or more than the winter kinds. Wheat in a rotation is sown on a turned clover sod, or on land which has been heavily manured the previous year for a corn or root crop; fresh stable manure is objectionable, but artificial fertilizers are used, and lime, where there is much organic matter in the soil, is beneficial; careful cultivators take great pains to clean their seed wheat from other seeds, and to get rid of all the light kernels; where smut is apprehended, the seed is wetted with a solution of sulphate of copper or strong brine, to kill the fungus spores. The seed is sown broadcast, or preferably by means of a drill, which deposits it in rows and covers it; when sown broadcast it is harrowed or ploughed in. In spring the winter wheat is harrowed. The weeds most troublesome to wheat in this country are the cockle (*lychnis githago*), of the pink family, and chess or cheat (*bromus secalinus*), which is sometimes so abundant that ignorant persons believe it to be degenerate wheat. In some of the New York wheat-growing counties gromwell (*lithospermum arvense*), there called red-root, is one of the most serious obstacles to the farmer. Rust and smut are minute vegetable forms which often cause serious damage to the stalk and grain. (See FUNGI.) Wheat is liable to be injured by several insects. (See HESSIAN FLY, WEEVIL, WHEAT FLY, and WHEAT MOTH.)—The history of most of the wheat-growing portions of this country shows a regular decrease in the yield; counties in the state of New York in which the average yield at the beginning of the century was 20 to 30 bushels to the acre, now return 5 to 7 bushels; in the fertile soil of Ohio the average diminished in 50 years from 26 bushels to half that amount; and so long as there remain new lands to be cultivated this will probably continue to be the case. That this decrease is due to the lack of a proper system of agriculture is shown by the fact that in England, where the land has been under cultivation for centuries, the average yield is 36 bushels to the acre. Seeds of wheat retain their vitality from 3 to 7 years; the stories of "mummy wheat," which is said to have germinated after remaining thousands of years in the tombs of Egypt, are now discredited; the cunning Arabs have even supplied credulous travellers with mummied maize grains and dahlia tubers, neither of which were known before the discovery of America.—Besides *triticum vulgare*, a few other species are cultivated in some countries, but have not been found desirable in this. The Egyptian wheat (*T. turgidum*) has heavy heads which bend over to one side, and hairy spikelets; forms of it have been somewhat cultivated in England, on low lands, but it yields an inferior flour. The one-grained wheat (*T. monococcum*), also called St. Peter's corn, has but one fertile floret in the spikelet, the grain of which ripening gives the head much the appearance of barley; its cultivation is confined to the mountainous portions of Europe. Spelt wheat, or spelt (*T. spelta*), bears a similar name in several European languages, and is much cultivated on the continent; it has a flat spike, which readily breaks up at the joints, and the grain is adherent to the palet or husk; it is only rarely grown in this country by Europeans, who have been accustomed to it at home.—Wheat properly stands at the

1. Spelt (Triticum spelta).
2. St. Peter's Corn (Triticum monococcum).

head of food grains, as it contains, besides a large amount of starch, nitrogenous principles, and those mineral elements required by the animal system; the grain raised in different countries or on unlike soils, as well as that of the different varieties, shows considerable variation in the proximate constituents. The average of recent analyses gives in 100 parts: water, 14·4; mineral matter, or ash, 2; albuminoids, 13; carbohydrates, 67·6; crude fibre, 3; fat, 1·5. The important constituents vary between the following extremes: albuminoids, from 10·7 to 21·5; carbohydrates, 60·2 to 70·2; crude fibre, 1·7 to 8·3. As to the mineral constituents, the average of 78 analyses gives the percentage of ash in the grain at 2·07; this chiefly consists, in 100 parts, of potash 31·1, soda 3·5, magnesia 12·2, lime 3·1, phosphoric acid 46·2, with sulphuric acid, chlorine, &c.—Wheat is mostly consumed in the form of flour, the composition of which depends greatly upon the manner of grinding. When a thin cross section of a wheat grain is examined with the microscope, the surface is found to consist of three layers of cells, the innermost being of longer cells than the outer two; these together form the hull or bran; just within these are cells containing aleurone (a convenient collective name for those granules which consist mainly of albuminoids), and within these are cells having starch as their chief content, though aleurone and mineral matters are more or less scattered throughout the grain, of which the starch cells make up the body. It is evident that the quality of the flour will depend upon that of the wheat, and the method by which its parts are separated in the mechanical operation of flouring; millers exercise much skill in so mixing the different varieties as to produce flour of a uniform quality. The finest flour is that which most nearly approaches pure starch, though not the most nutritious. After grinding, the whole as it comes from the mill passes into a long cylinder or bolt; this is an octagonal frame, sometimes over 30 ft. long, about 3 ft. in diameter, inclining $\frac{3}{4}$ in. for each foot in length, and arranged to revolve; it is covered with bolting cloth, a sieve-like silken fabric of various degrees of fineness, that near the upper end of the bolt having the closest mesh; the meal from the mill, being deposited at the upper end of this, is separated into different degrees of fineness, while the coarser portions pass out at the lower end. The fine flour, about 80 per cent. of the grain, passes through the upper portion of the bolt, while the coarser appears lower down, and is known as middlings, pollard, and by various other local names; the coarsest is shorts and bran. In fine flour the percentage of starch is much greater, and that of the albuminoids and earthy matters less, than in the whole grain; consequently this is not so nutritious as a flour which more nearly represents the wheat itself. Various expedients have been used for producing a flour which shall contain more albuminoids and phosphates than fine flour; the well known Graham flour should consist of the whole wheat ground fine, but much that is sold under this name is merely bran and shorts subjected to a second grinding; properly prepared, Graham flour is very nutritious, but, owing to the amount of crude fibre it contains, irritates the bowels of weak persons. Of late there have been several processes invented, which propose to first remove the inert hull or bran and then grind the decorticated grain; flour prepared in this manner is as fine as any other, and contains much more of the nutritive principles. Whole wheat, prepared by soaking, and afterward boiled with milk and sweetened, was formerly used as food in England under the name of frumity. In this country wheat, first carefully freed from its hairs and all foreign substances, is coarsely ground, and is much used as a dietetic preparation under the name of crushed or cracked wheat, or wheaten grits. The wheat of southern countries contains a larger percentage of albuminoids than any other, and is used to make macaroni, a favorite food in southern Europe, and imported into this country in considerable quantities. (See Macaroni.) Bran and shorts are valuable food for domestic animals, especially for milch cows; bran contains a larger percentage of albuminoids, fat, and phosphates than whole wheat, and more starch remains with it than is generally supposed. Wheat straw, while it is wasted or even burned to get rid of it by improvident farmers, is of value as food, especially to mix with the more concentrated foods, such as Indian meal and oil cake. The threshing machines break up the straw quite short, and this prevents its being utilized for many of the purposes for which hand-threshed straw may be employed. (See Straw.)



Part of Section of a Wheat Grain, magnified.

WHEAT FLY, the name given in Europe to the *cecidomyia tritici* (Kirby), a small dipterous insect of the family of gall gnats, from its depredations on wheat, to which it is nearly as destructive as the famous and closely allied species, the Hessian fly. The perfect insect is $\frac{1}{10}$ of an inch long, orange red, with whitish wings hairy on the edges, and black eyes. They deposit their eggs in the centre of the corolla of the wheat flower, coming out in great numbers between 7 and 9 P. M. early in June, several laying on the same ear; the eggs are hatched in eight to ten days, and the larvæ, footless grubs nearly an eighth of an inch long when fully grown, feed upon the flower, rendering it abortive, and not upon the stem like the Hessian fly; they are yellowish, with sharp head and truncated tail, and have a quick wriggling motion; by the first of August they descend about half an inch into the earth, and there remain through the winter. The pupa is narrower, rufous, and sharp at both ends. An insect considered by Harris the same appeared in northern New England about 1828, whence it spread to Canada, Massachusetts, and New York, and disappeared only by being starved out by a change of crop or the substitution of late sown spring wheat. (See Harris, "On the Insects injurious to Vegetation.") The most efficacious remedies are fumigations with sulphur for several evenings in succession while the grain is in blossom; lime and ashes strewn over them when wet with dew; liming and ploughing the soil into which they have burrowed; and sowing late in spring or early in autumn. A little black ichneumon fly deposits her eggs within these larvæ, and destroys many.

Wheat Fly (Cecidomyia tritici).

WHEATLEY, Phillis, a negro poetess, born in Africa about 1753, died in Boston, Dec. 5, 1794. She was brought to Boston in 1761, was purchased by Mrs. Wheatley, was instructed by her mistress and her daughters, and acquired a superior education. She wrote verses at the age of 14, and at 19 visited England, where she attracted much attention. A volume of her poems was published there, containing her portrait, and bearing the title, "Poems on various Subjects, Religious and Moral, by Phillis Wheatley, Negro Servant to Mr. John Wheatley of Boston, in New England" (London, 1773). It was reprinted in Boston, and passed through several editions. The family of Mr. Wheatley being broken up by death, she married a negro named Peters, and her last days were spent in extreme want. Her letters were privately printed in 1864.

WHEAT MOTH. There are two kinds of moths which do serious injury to grain crops, not only in America, but also in Europe, where they both originated; one is the *tinea granella*, frequently called corn moth, and the other the *butalis* or *gelechia cerealella*, which has received the name of Angoumois grain moth, from the district in France where its ravages first proved extensive. The first is a minute insect, closely allied to the common clothes moth, belonging to the same family *tineadæ*. The caterpillar which does the injury attacks stored grain and not the growing wheat; it is a small, soft, pale buff, cylindrical worm, with a dark head and dark spot behind the head, and is scarcely half an inch in length when fully grown; these caterpillars pass from one grain to another, gnawing large holes in them, and spinning little threads of silk wherever they go, so that grain much infested by them will frequently be entirely entangled in webs. It spins a cocoon made of grains of wood mingled with silk, much of the size and shape of the wheat grains, and emerges as a moth in the succeeding summer, having very much the appearance of the clothes moth, except in its markings; the wings are very long and narrow, and heavily fringed, spreading but little more than half an inch; the upper wings are pale buff mottled with dark brown, and the under wings uniform pale brownish. The Angoumois grain moth belongs to the family *yponomentadæ*, and is even smaller than the preceding; yet so abundantly does it propagate itself that in France whole provinces have been threatened with famine by the almost total destruction of their crops of barley and wheat. The upper wings are pale cinnamon brown, having the lustre of satin; under wings of a leaden color, and very broadly fringed. About 75 eggs are laid by a single insect, spread about in groups upon three or four different grains; in a few days the caterpillars are hatched, and the work of destruction begins; each seeks a grain of wheat, into which it burrows, closing up the minute entrance; a single grain affords just sufficient nutriment to last the caterpillar during its life; at maturity it is only about a third of an inch long, very smooth and quite white, with its head only a little brown; it partitions off at one side of its abode the loose particles of rejected material by a thin web, and then eats a hole through the shell, leaving only so thin a pellicle as the escaping moth may break through, after which it changes within the grain to a smooth chrysalis, blunt at either end. There are two broods at least of the moth, one appearing in the autumn, and laying eggs to produce the caterpillars which live in the hearts of the grain during the winter, the other appearing as moths in the late spring, whose progeny require but a short time for their maturity. The best mode of checking their ravages appears to be by kiln-drying the grain which has been attacked.

Tinea granella.

WHEATON, Henry, an American publicist, born in Providence, R. I., Nov. 27, 1785, died in Dorchester, Mass., March 11, 1848. He graduated at Brown university (then Rhode Island college) in 1802, studied law, and after being admitted to the bar visited Europe. Soon after his return he settled in New York, where he practised law and wrote for the "National Advocate," a daily newspaper, on the question of neutral rights, which had given rise to the existing war with Great Britain. During the same period he was for a short time one of the justices of the marine court. In 1815 he published a "Digest of the Law of Maritime Captures or Prizes," which in reality was an exposition of the law of nations as then administered. This was received with much favor. About this time he also published "An Essay on the Means of maintaining the Commercial and Naval Interests of the United States." From 1816 to 1827 he was reporter of the decisions of the supreme court of the United States. His reports, extending to 12 volumes, are largely annotated and constitute a high authority. He also published "Digest of the Decisions of the Supreme Court of the United States, 1789–1829" (2 vols. 8vo, New York, 1821–'9). During this period he was a constant contributor to the "American Quarterly" and the "North American Review." His anniversary address before the historical society of New York in 1820, upon the "Science of Public or International Law," contains the germ of his works on the law of nations. In 1821 he was a delegate from New York to the convention for forming a new constitution for the state. In 1825 he was associated with Benjamin F. Butler, afterward attorney general of the United States, and John Duer in a commission for revising the statute law of New York. In 1826 he published the "Life of William Pinkney," and subsequently wrote an abridgment of it for Sparks's "American Biography." He was appointed chargé d'affaires to Denmark in 1827, and resided at Copenhagen till 1835, when he was appointed minister resident to the court of Prussia. Two years later he was made minister plenipotentiary, which office he retained till 1846. In these posts he won great reputation as a diplomatist, by his negotiations on the Sound dues, the Scheldt dues, the tolls on the Elbe, and the rights of naturalized citizens, and especially by the treaty of 1844 with Germany, though that was rejected by the senate for party reasons. In 1831 appeared his "History of the Northmen, from the Earliest Times to the Conquest of England by William of Normandy" (London and Philadelphia; translated into French by M. Guillot, Paris, 1844). At the time of his death he was engaged upon a new and greatly enlarged edition of this work. The "History of Scandinavia" (1838) was the joint production of Mr. Wheaton and Dr. Crichton, and intended as a sequel to the "History of the Northmen." In 1836 his "Elements of International Law" appeared in England and the United States. In 1841 he wrote a prize essay for the French institute, under the title *Histoire du droit des gens en Europe, depuis la paix de Westphalie jusqu'au congrès de Vienne* (enlarged ed., Leipsic and Paris, 1846), of which the English version is entitled "History of the Law of Nations in Europe and America, from the Earliest Times to the Treaty of Washington" (New York, 1845). The "Elements of International Law" has ever since its publication been regarded throughout Europe as a standard authority. In 1864 a translation into Chinese was made and published at Peking by order of the imperial government. After the author's death a 6th edition (Boston, 1855), with extensive notes and a biographical memoir, was prepared at the request of Mr. Wheaton's family by W. B. Lawrence, who also edited with additional notes a 7th edition (1863). An 8th edition with new notes and a new memoir, by R. H. Dana, jr., appeared with the sanction of the family in 1866. In 1842 Mr. Wheaton published in Philadelphia "An Inquiry into the British Claim of a Right of Search of American Vessels." In 1843 he was elected a corresponding member of the French institute, and in 1844 a foreign member of the royal academy of science of Berlin. He returned to the United States in 1847.

WHEATSTONE, Sir Charles, an English physicist, born in Gloucester in 1802, died in Paris, Oct. 19, 1875. He was from early youth a musical instrument maker, which led him to investigate the laws of sound and their application to music; and in 1823 and subsequently he published papers on the subject in the "Annals of Philosophy" and the "Quarterly Journal of Science." In 1833 he published in the "Philosophical Transactions" papers on Chladni's figures, and in 1834 his celebrated "Account of some Experiments to measure the Velocity of Electricity and the Duration of Electric Light." (See Electricity, vol. vi., p. 509.) In 1834 he was appointed professor of experimental philosophy in King's college, London, and in 1836 elected a fellow of the royal society, when he read a paper entitled "Contributions to the Physiology of Vision;" and this led to the invention of his stereoscope, which he first exhibited in 1838. In connection with William Fothergill Cooke, he made experiments and attained results in the transmission of intelligence upon copper wires by means of electricity which entitle him to be regarded as one of the inventors of the electric telegraph as a practical reality; and though Morse's invention was undoubtedly of earlier date, there is no reason to suppose that he knew of Morse's discovery at the time (June, 1836) when his own experiments were made public. He was associated with Mr. Cooke in the first telegraph patent in England. The electro-magnetic alarum was also invented by him, as well as several instruments for registering by means of electro-magnetism the indications of the thermometer, barometer, &c., transit observations in astronomy, and extremely short intervals of time. Among his other publications were papers on the "Physiology of Vision" (1852), the "Binocular Microscope" (1853), "Fessil's Gyroscope" (1854), "Powers for Arithmetical Progression" (1854–'5), and "Automatic Telegraphy" (1859). Wheatstone was one of the jurors in the class for heat, light, and electricity in the Paris exposition of 1855. In 1868 he was knighted and received the Copley medal of the royal society for his researches in acoustics, optics, electricity, and magnetism.

WHEDON, Daniel Denison, an American clergyman, born in Geddes, Onondaga co., N. Y., March 20, 1808. He graduated at Hamilton college in 1828, and studied law. He was professor of ancient languages and literature in the Wesleyan university, Middletown, Conn., from 1832 to 1843, and in 1836 was ordained as a minister of the Methodist Episcopal church. In 1845 he was elected professor of rhetoric, logic, and history in the university of Michigan, which post he filled for eight years; and in 1856 he was elected editor of the "Methodist Quarterly Review" and general editor of the publications of the Methodist book concern, New York, which post he still holds (1876). He has published "Public Addresses, Collegiate and Popular" (1856); "The Freedom of the Will" (1864); and a "Commentary on the New Testament" (4 vols., 1866 *et seq.*, to be completed with vol. v.).

WHEEL, a solid piece or frame of wood or metal, usually circular, fixed to or movable upon a solid axis, about the centre line of which in either case it is intended to turn. The solid axis, when the wheel moves freely upon it, is commonly called an axle; when the wheel is fixed to and turns with it, an arbor or shaft. The true or mathematical axis is always the fixed line about which the revolution of the wheel occurs. This line, or a point in it, is also called the centre of the wheel. When, as is ordinarily the case, this centre of motion coincides with the centre of form, we have a centred wheel; in case the centre of motion is to one side of the centre of form, an eccentric wheel. Both these sorts of wheels are circular; but for peculiar purposes wheels which are elliptical, or of a variety of curved outlines, are employed. Wagon wheels are usually made of wood, with a band of iron. Water wheels are made of wood, supported by iron. Wheels for heavy machinery, whether to be connected with cogs or by bands, are usually made of iron, but sometimes of iron and wood, and sometimes of brass. Wheels for clocks and watches are usually made of brass, as they also are in philosophical apparatus. The various kinds of wheels are designated according to their uses; as fly wheels, for equalizing the motion of machinery by employing the reserved force of the momentum of a rapidly rotating wheel; balance wheels, such as are used in clocks and watches as parts of the escapement; crown wheels, having the cogs or teeth upon the face; spur wheels, having them upon the periphery; band or belt wheels, which communicate motion to each other by means of bands; ratchet wheels, which are held from moving in one direction by means of a ratchet, &c. When two wheels are placed upon a common axle, and one is much larger than the other, the former is called a wheel and the latter a pinion; and the cogs of the pinion are technically called leaves. By a train of wheels, or of wheelwork, is usually meant more than two wheels through which motion is successively transmitted. Evidently, the teeth upon two wheels or a wheel and pinion intended to engage, must be of like size and of corresponding form. The cutting and forming of the teeth, so as to secure continued rolling and action, with the least practicable jar, needless friction, and wear, is a consideration of much importance, and to which much study has been given. Two general forms have been found best to satisfy these conditions: 1, that in which the general outline of the teeth is that of epicycloids or hypocycloids; 2, that in which they have the form of involutes of a circle. For the manner of determining these curves in practice for teeth of wheels having various sizes, and the use of the odontograph, by aid of which the curves are described, as well as for specific information respecting wheel work and the variety of other connections in machinery which cannot here be detailed, the reader is referred to Willis's "Principles of Mechanism," Buchanan's "Practical Essays on Mill Work and other Machinery," Mosely's "Mechanical Principles of Engineering," &c., Rankine's "Applied Mechanics," and other similar works.—Carriage wheels, in order to bear without fracture the concussions to which they are subject, require to be exceedingly strong, and somewhat elastic. Ordinary carriage wheels consist of a cylindrical block at the middle, the nave, turning on an axle, and having spokes in the direction of radii, which unite the nave with the wooden circular segments or fellies constituting the rim, which are enclosed and held together by a wrought-iron tire. The tire, being made slightly small for the rim, is expanded by heating to redness, and in this condition is driven upon the rim and bolted to it; the contraction of the metal in cooling binds the fellies very firmly to one another and upon the spokes. Carriage or wagon wheels may be made flat; but they are most commonly "dishing" from the nave outward to the rim, for the double purpose of securing width of base to the vehicle, so as to lessen the danger of overturning, and of enabling the wheel better to resist lateral shocks. M. A. Morin found, as the result of many experiments, the ratio of the resistance to be overcome by the team to the whole load, with various styles of heavy-loaded wagons, to vary from $\frac{1}{21}$ on a wet road with ruts, to $\frac{1}{51}$ on a solid, dry road of hard gravel; the friction at the axles being, of course, reduced by the best lubricants. Generally, it may be stated that the ratio of draught to load on well macadamized roads in good order will be $\frac{1}{35}$ to $\frac{1}{40}$; on fresh gravelled roads, often as great as $\frac{1}{16}$; on gravelled roads beaten hard, $\frac{1}{35}$; and on the best paved or hard earth roads, about $\frac{1}{70}$. Of the most important of Morin's results the following is a brief summary: 1, the resistance to wagons on solid metalled roads or pavements, taken with reference to the axle, and in a direction parallel to the ground, is sensibly proportional to the pressure or total weight of vehicle and load, and inversely proportional to the diameter of the wheels; 2, on such roads the resistance is very nearly independent of the width of the tires; 3, upon compressible bottoms, such as earths, sands, gravel, &c., the resistance decreases with increased width of tire; upon soft earths, such as loam or sand, the resistance is independent of the velocity; 5, upon metalled roads and upon pavements the resistance increases with the velocity, but the resistance is less as the wagon is better hung (with good springs) and the road more smooth; 6, the inclination of the line of draught (the direction in which the pull of the team takes effect) should approach the horizontal for all roads, and for common wagons so far as the construction will admit. These results or laws are to be regarded as approximations, and as, practically, varied with the conditions. It is usual not to bring the line of draught nearer than by about 15° to the horizontal. (See the chapter on "Draught of Vehicles" in Morin's "Fundamental Ideas of Mechanics, and Experimental Data," New York, 1860.)—Car wheels were at first made like ordinary spoke wheels, and were guided by flanges on the rails, as on the Sheffield colliery railroad in 1767, where the rails were of cast-iron. In 1789 car wheels were made with flanges to run on an edge rail, that is, a rail which rested upon its edge instead of lying flat. These rails were first made of cast iron and used at Loughborough, England. Car wheels with cast-iron hubs and rims and wrought-iron spokes were patented by Stevenson and Losh in 1816. A wrought-iron tire was shrunk on to the rim, and secured in its seat by a dovetailed depression. At the present time there are in use in the United States the following kinds of car wheels, which may be mentioned as examples of different modes of construction. The Washburne wheel, patented by Sax and Kear, is composed of a cast-iron centre surrounded by a steel tire. It is made by first raising the tire to a white heat and almost to the fusing point, and casting the centre into it, which causes the union of the two parts. These wheels are heavy and durable, and capable of running 200,000 miles. As is the case with all car wheels, the centre may be composed of a hub and spokes, or of a hub and disk. In Moore's patent there is a packing of wood for diminishing the jar between the cast-iron centre and the steel rim, the latter being put on with hydraulic pressure. There are many wheels now made with a cast-iron centre and a steel tire shrunk on. Atwood's patent wheel, recently introduced, consists of a cast-iron centre and steel tire, between which there is a highly compressed oakum packing for the purpose of diminishing the jar. The kind in most general use is the chilled iron wheel, made of different patterns by different car wheel companies, but in all cases cast into a cold cast-iron mould, which chills the surface of the rim. This wheel has no separate tire, and cannot in consequence be "turned up" in a lathe when the rim becomes worn, as all steel-tired wheels can. The usual mileage of chilled iron wheels is 60,000 miles. The Hamilton steel wheel company are introducing a wheel made of a mixture of cast steel and cast iron, melted and cast together, whereby the strength is supposed to be increased. It is intended as a substitute for the chilled iron wheel. Car wheels are also made entirely of cast steel, which can, like steel-tired wheels, be "turned up" when worn. The driving wheels of locomotives are made with cast-iron centres and steel tires shrunk on. Formerly car wheels were keyed on their axles, but now the hole in the hub is turned slightly smaller than the perfectly cylindrical axle, which is then thrust in with hydraulic pressure. Wheels so treated have the advantage of never getting loose, while the keyed wheel always will in time with constant use. The bearings of locomotive wheels, both small and drive wheels, are on the inside, but truck wheels have the bearings on the outside. The bearing consists of a brass or other composition box in which the wrought-iron axle turns.—Water wheels are intended to impart to connected machinery the moving force due to the weight or momentum of water, or to both these combined. They are divided into two general sorts, according as they have horizontal or vertical axes. The latter, most of which are also reaction wheels, are considered under TURBINE. The former class, or those with horizontal axes, include the earliest known forms of water wheel; and they are generally the simpler in construction. If the natural current of a stream be employed, it readily appears that, supposing the conditions of depth and friction along the bed to correspond, the moving force in any case will be as the product of the volume of water that would in a given time strike and act on the float boards of a wheel into the amount of fall, or the descent of the stream within a given distance. But owing to the irregularities in the volume and velocity of streams at different seasons, and the loss of momentum by friction against their beds, it becomes desirable to accumulate and retain a certain supply or head of water, and to develop the impelling force of this, due to volume and gravity, at a fixed position. These results are secured by constructing a weir or dam across the stream, and allowing the water collecting in a pond above this to fall upon the wheel at one of three points, which points of application of the force give to the wheel the name of overshot, undershot, or breast wheel. The tide wheel is a variety of undershot. The undershot wheel is set directly in a running stream, or it is placed close to a fall or a dam; in the last case, the water is admitted to its lower side by a gate from the bottom of the pond. It is simply a large and strong wheel having stays projecting from its rim, upon which stout planks, called floats, and also palettes, extend along its length. The current or issuing water strikes these floats, and imparts movement to the wheel. Owing to friction, irregular flow of the issuing body of water, and the impossibility of consuming on the floats its entire moving force, the performance of common undershot wheels never exceeds from 25 to 33 per cent. of the power in the acting body of water. In Poncelet's wheel, however, with curved floats, into which the issuing body of water rises with more uniform movement, until its velocity is nearly or quite consumed, and from which it also escapes with less of back pressure and irregularity, the floats being in number about double those of the common form, a larger utilization of the water, rising to 50 or 60 per cent., is secured. Of overshot wheels, the summit is placed at or a little below the upper lever of the water; and the flow upon the rim of the wheel can be regulated by a flood gate. The water is received into cavities formed by stout planks extending between the two ends of the wheel, and placed at an angle or curved toward the stream; these are buckets proper, and the wheels are sometimes called bucket wheels. Borda showed that the maximum effect with overshot wheels is secured when the diameter equals the height of fall; but, other things being equal, the useful effect is greater the slower the revolution allowed; since, in such case, the water can enter the buckets more regularly, it is not flung from them by centrifugal force, and its velocity and impulsion are almost wholly consumed upon the wheel before it is released. Under the best conditions, this wheel utilizes 75 per cent. of the moving power of the water. The breast wheel resembles in form and construction the undershot, but has its floats closer together, and usually inclined toward the stream. It is set so that about one quadrant of it is turning close to a curved channel corresponding to its form, down which the supply of water (regulated by a gate) descends; and it is therefore impelled both by the weight and momentum of the water. As it is thus intermediate in its action between the undershot and overshot wheels, so it is also in its value. Being less loaded with the weight of water than the overshot, it moves with less strain and friction on its bearings, and under the best circumstances affords about 65 per cent. of the moving power. At the Burden nail works, Troy, N. Y., the overshot wheel furnishing the power required is 60 ft. in diameter and 22 ft. in breadth. The largest water wheel in the world is probably one employed in working a lead and silver mine in the Isle of Man. This is an overshot wheel, 72 ft. 6 in. in diameter, 6 ft. in breadth, with a crank stroke of 10 ft.; it is estimated to give 200 horse power, and pumps 250 gallons of water a minute 400 yards high.

WHEELER, William Adolphus, an American lexicographer, born in Leicester, Mass., Nov. 14, 1833, died in Roxbury, Oct. 28, 1875. He graduated at Bowdoin college in 1853, taught school a few years, and became Dr. Worcester's assistant in compiling his quarto dictionary, published in 1859. To the appendix of this work he contributed a table entitled "Pronunciation of the Names of Distinguished Men of Modern Times." Subsequently, with Richard Soule, he prepared the book known as Worcester's spelling book. He was employed as general reviser of the edition of Webster's dictionary published in 1864, and contributed to it an "Explanatory and Pronouncing Vocabulary of the Names of Noted Fictitious Persons and Places," which was enlarged and published separately (12mo, Boston, 1865). He revised and edited Hole's "Brief Biographical Dictionary," and the "Dickens Dictionary," and had begun a "Cyclopædia of Shakespearian Literature." Besides this, he left unfinished an index to the principal works of ancient and modern literature, to be entitled "Who Wrote It?" He had been from 1867 assistant superintendent of the Boston public library.

WHEELING, a port of delivery and the largest city of West Virginia, capital of the state and of Ohio co., on the E. bank of the Ohio river and on both sides of Wheeling creek, 92 m. below Pittsburgh, 365 m. above Cincinnati, and 215 m. W. N. W. of Washington; lat. 40° 7′ N., lon. 80° 42′ W.; pop. in 1850, 11,435; in 1860, 14,083; in 1870, 19,280, of whom 4,153 were foreigners and 390 colored; in 1876, locally estimated at 30,000. It extends 5 m. along the river, with a breadth of from two to eight squares, and is bounded in the rear by a range of hills. It is divided into eight wards, but is popularly known by five divisions, viz.: North, East, and Centre Wheeling, Zane's island, and South Wheeling. The island, in the Ohio river, is more than a mile long, and contains 400 acres; it is connected with the city by a fine suspension bridge. The custom house, of stone, also contains the post office and United States court room. There are an odd fellows' hall, a public library, and an opera house. A new capitol is in course of erection. There is an extensive fair ground, with a trotting course. Wheeling has an important trade by way of the river and the Baltimore and Ohio railroad and its connecting lines. On June 30, 1875, there were belonging to the port 73 steamers, tonnage 8,508, and 128 barges, tonnage 13,336. During the year ending on that date 11 steamers, tonnage 2,067, and 17 barges, tonnage 1,383, were built. The chief interest is manufacturing, for which the city has rare advantages. The surrounding hills and the adjacent country contain immense deposits of bituminous coal, which is readily and cheaply obtained. The leading establishments are iron and nail mills, glass works, and founderies and machine shops. There are in the city six nail factories and two manufactories of railroad, merchant bar, and sheet iron, while within a radius of four miles are four other large iron and nail works. The spike mills produce annually 60,000 kegs for railroad and boat building. The Superior foundery and machine works, covering 2½ acres, produce castings of all kinds, rolling mill, steamboat, and blast furnace engines, and mowing and reaping machines. There are six extensive glass factories. There are a national bank, with a capital of $200,000, and several state banks, with $1,400,000 capital. Each ward has a free public school, in which both English and German are taught. The Wheeling female college is on the highest ground in Centre Wheeling. About 2 m. from the city is the convent Mt. de Chantal, a school for girls. In the city is St. Joseph's academy for males, adjoining the cathedral. The Wheeling library association has a reading room and a library of 5,000 volumes. There are three daily and five weekly (one German) newspapers, and 21 churches.—Wheeling was settled in 1774, and incorporated in 1806. It became the county seat in 1797. It was the seat of government of West Virginia from the organization of the state till 1870, when the capital was removed to Charleston. In 1875 the state government was reëstablished at Wheeling.

WHEELOCK. I. Eleazar, an American clergyman, the founder and first president of Dartmouth college, born in Windham, Conn., April 22, 1711, died in Hanover, N. H., April 24, 1779. He graduated at Yale college in 1733, and from 1735 to 1770 was pastor of the second Congregational society in Lebanon, Conn. He established a missionary school there, called "Moor's Indian charity school," out of which grew Dartmouth college. (See DARTMOUTH COLLEGE, and OCCOM, SAMSON.) He removed to Hanover in 1770, and presided over his new college nine years. He published a "Narrative of the Indian School" in 1762, and several continuations of it up to 1773. He received the degree of D. D. from Edinburgh university in 1767. A memoir of him, with selections from his correspondence, appeared in 1811. **II. John,** second president of Dartmouth college, son of the preceding, born in Lebanon, Conn., Jan. 28, 1754, died April 4, 1817. He entered Yale college in 1767, but graduated with the first class at Dartmouth in 1771, and was a tutor there from 1772 to 1776. In 1775 he was elected to the colonial assembly, and in 1777 was appointed a major in the New York forces, and soon after lieutenant colonel in the continental army. In 1778 he commanded an expedition against the Indians, and soon after he was placed on Gen. Gates's staff. Though only 25 years old at the death of his father, he was chosen to succeed him as president of the college. In 1782 the trustees sent him to Europe to procure books, money, &c., for the institution, which were lost by shipwreck off Cape Cod. An ecclesiastical controversy among the trustees occasioned his removal in 1815. In 1817 a new board of trustees restored him to office, but he died a few weeks after. He bequeathed half his large estate to Princeton theological seminary. He published "Sketches of the History of Dartmouth College" (1816).

WHEELWRIGHT, John, an American clergyman, born in Lincolnshire, England, in 1594, died in Salisbury, N. H., Nov. 15, 1679. He was a graduate of Cambridge, and for some years a clergyman of the established church at Alford, Lincolnshire; but in 1636, being displaced by Archbishop Laud, he emigrated to Boston, and was chosen pastor of a branch church, in what is now Braintree. The celebrated Mrs. Anne Hutchinson was his sister-in-law, and he partook of her views. Differences of opinion led to personal animosities between him and Mr. Wilson, the pastor of the Boston church; and the general court in its session of 1636–'7 appointed a fast, partly to heal these dissensions. On this occasion Mr. Wheelwright preached in Boston, and for his sermon the general court pronounced him guilty of sedition and contempt, and after some months' delay he was banished from the colony. In 1638 he formed a settlement on the banks of the Piscataqua, which he called Exeter. After five years Massachusetts claimed this town, and he removed with a part of his church to Wells in the district of Maine. In 1646 he was permitted to return to Massachusetts, and settled in Hampton. In 1654 he published his "Vindication." He went to England in 1657, but returned in 1660, and settled as pastor in Salisbury in 1662. He published *Mercurius Americanus* (4to, London, 1645).

WHEELWRIGHT, William, an American capitalist, born in Newburyport, Mass., in 1798, died in London, Sept. 26, 1873. When 25 years old he commanded a trading vessel on the W. coast of South America, and in 1829 established a line of sailing passenger vessels between Valparaiso and Cobija. In 1835 he planned a line of steamers on the W. coast, which resulted in the foundation in 1838 of the Pacific steam navigation company, now (1876) running 54 steamers. In 1842 he suggested and afterward built a railway from Santiago to Valparaiso. In 1849–'52 he built the railway from the port of Caldera, which he created, to Copiapó, 50½ m., afterward extended to Tres Puntos. In 1855 he planned a railway from Caldera across the Andes to Rosario on the Paraná, 934 m. It was opened from Rosario to Córdoba in the Argentine Republic in 1870, and to Ensenada on the Atlantic in 1872. He also constructed the first telegraph line and the first gas and water works in South America. He was buried at Newburyport.—See *La vida y los trabajos industriales de William Wheelwright en la America del Sud*, by J. B. Alberdi (Paris, 1876).

WHELK, a marine, univalve, gasteropod shell, of the genus *buccinum* (Linn.). There are about 20 living species, and more than 100 fossil in the miocene formations. The shell is ovate-conic, the aperture having a notch without a canal, and the pillar not flattened and somewhat twisted. The common whelk, or buckie (*B. undatum*, Linn.), is the largest, being about 3 in. long, grayish or brownish white, with numerous raised lines and striæ; it is very common on the coasts of Great Britain, where it is dredged as an article of food; it is found from low-water mark to a depth of 100 fathoms, and is distributed through the Irish, North, and Arctic seas, along the American shore from Cape Cod to Greenland, and across to the Siberian and Okhotsk seas; it is found fossil in the newer pliocene of Sicily, though not now living in the Mediterranean. The most common species on the Atlantic coast of America is the *B. obsoletum* (Adams), ovate, reddish or olive brown, with a network of lines, aperture dark violet, with six whorls and apex generally eroded; it is about an inch long and half an inch wide; the animal is mottled with slate color. Its movements are very active, and its food consists of dead crabs, fish, &c.; it prefers muddy, still inlets, flats uncovered at low tide, and the mouths of brackish rivers.

Common Whelk (Buccinum undatum).

WHEWELL, William, an English philosopher, born in Lancaster, May 24, 1794, died in Cambridge, March 5, 1866. He graduated at Trinity college, Cambridge, in 1816, obtained a fellowship, and was professor of mineralogy from 1828 to 1832. In 1838 he was elected professor of moral theology or casuistry, in 1841 became master of Trinity college, and in 1855 vice chancellor of the university of Cambridge, when he gave up his professorship. His first publications were mathematical works for the use of students of the university. In 1833 he published "Astronomy and General Physics considered with reference to Natural Theology," being the third Bridgewater treatise (new ed., 1864). This was followed by philosophical works, the most important of which are: "Four Sermons on the Foundations of Morals" (1837); "History of the Inductive Sciences" (3 vols., 1837; 3d ed., 1857); "Philosophy of the Inductive Sciences" (2 vols., London, 1840; remodelled in 3 parts, 1858–'60); "Lectures on the History of Moral Philosophy in England" (1852; new ed., 1862); and "The Platonic Dialogues for English Readers" (3 vols., 1859–'61). Among his other works are: "Architectural Notes on German Churches" (1835); "Thoughts on the Study of Mathematics" (1835); "On the Principles of English University Education" (1837); "On Liberal Education" (3 parts, 1845–'52); "Of the Plurality of Worlds" (anonymous, 1853); and "Lectures on Political Economy" (1863). He also translated and edited numerous works. An account of his writings, with selections from his correspondence, was published by Isaac Todhunter in 1876.

WHIG AND TORY, designations of political parties in English, and more lately in American history, originally applied as terms of reproach. The word "whig" is a contraction of "whiggamore," which in the southwestern counties of Scotland denotes a drover. In 1648 a party of Covenanters from this region attacked Edinburgh. "This," says Burnet, "was called the whiggamores' inroad; and ever after all that opposed the court came in contempt to be called whiggs; and from Scotland the word was brought into England." The term came into general use in 1679, during the struggle between the court and country parties on the bill for the exclusion of the duke of York from the line of succession. The opponents of the bill were called in contempt tories, and the friends of the duke retorted by calling their adversaries whigs. The word "tory" is derived from an Irish term applied, says Roger North, to "the most despicable savages among the wild Irish;" and the name was given to the followers of the duke because he favored Irishmen. But according to other authorities, the tories were originally merely the successors of the cavaliers of the civil wars, who believed that the maintenance of a royal line was the end or the necessary means of a lawful government, who vindicated the divine right of kings, and held high notions of prerogative. The tories subsequently took broader ground, and their leading principle became the maintenance of things as they have been, or at least as they are; whence Johnson gives the following definition: "One who adheres to the ancient constitution of the state and the apostolical hierarchy of the church of England." The word is now applied rather to certain traditional maxims of public policy, the political successors of the tories being called conservatives. The whig party has generally adhered to progressive principles since it first received its distinctive name, though time and circumstances have effected important modifications in its professions and modes of action. The whigs came into power in England with the accession of William III., and were in general the dominant party until the middle of the next century; after which the tories predominated for upward of 80 years. The agitation of the reform bill and of Catholic emancipation again brought the whigs into power, but since 1830 the settlement of old disputed issues has made the term practically obsolete; and the whig party now call themselves liberals, and a more advanced wing of the party are known as radicals.—In the United States the term whig was applied during the revolution to the patriotic party, the adherents to the crown being called tories. Both words subsequently disappeared from the political vocabulary of the country until the presidential election of 1832, when the anti-Jackson party took the name of whig. The party broke up in 1854-'5.

WHIMBREL. See CURLEW.

WHIN. See ULEX.

WHIN CHAT. See STONE CHAT.

WHIPPLE, Abraham, an American naval officer, born in Providence, R. I., Sept. 16, 1733, died near Marietta, O., May 29, 1819. In early life he was captain of a merchant vessel, and in the French and Indian war, in command of the privateer Game Cock, he took in a single cruise 23 French prizes. In 1772 he commanded the expedition secretly organized in Providence, which burned his majesty's armed schooner Gaspee in Narragansett bay. In 1775 he commanded, with the title of commodore, two armed vessels and two row galleys fitted out by Rhode Island, which captured one of the tenders to the British frigate Rose, off Newport. He afterward commanded the schooner Providence, which captured and destroyed more vessels than any other in the service during this period; but she was finally taken by the British. He was then placed in command of the new frigate Providence, and sent to France with government despatches. In 1779 he encountered the homeward-bound Jamaica fleet of nearly 150 sail, convoyed by a 74-gun ship and several smaller vessels. He concealed his guns, hoisted British colors, and joined the fleet as one of the merchantmen. Each night he captured a vessel, which he manned from his own crew and despatched homeward. In this way he took ten richly laden vessels, eight of which reached American ports in safety. When endeavoring with a squadron to save Charleston from capture in 1780, he lost his vessels, and was held as a prisoner till the end of the war. In 1784 he commanded the first vessel that displayed the United States flag on the Thames. On leaving the service he retired to a farm in Cranston, a few miles from Providence, until the formation of the Ohio company in 1788, when he removed to Marietta.

WHIPPLE, Edwin Percy, an American author, born in Gloucester, Mass., March 8, 1819. At the age of 15 he became clerk in a bank in Salem, and at 18 entered a banking house in Boston, of which he rose to the chief clerkship; and he was superintendent of the reading room of the merchants' exchange from its foundation till 1860. In 1840 he delivered a humorous poem before the mercantile library association of Boston, and in 1850 a fourth of July oration before the city authorities, on "Washington and the Principles of the American Revolution." He has published "Essays and Reviews" (2 vols., 1848); "Lectures on Subjects connected with Literature and Life" (1849); a life of Macaulay, prefixed to an edition of his essays (1860); "Character and Characteristic Men" (1867); and "The Literature of the Age of Elizabeth," a course of lectures delivered in 1859 before the Lowell institute (1869).

WHIPPLE, William, a signer of the Declaration of Independence, born in Kittery, Me., Jan. 14, 1730, died Nov. 28, 1785. He was early sent to sea in a merchant vessel, and before his 21st year had made several voyages to Europe as captain. In 1759 he became a merchant at Portsmouth, N. H. In 1775 he was a member of the provincial congress at Exeter, and next year of the continental congress. In 1777 he was commissioned brigadier general, and commanded the New Hampshire troops at Saratoga. In 1778 he coöperated with Gen. Sullivan in the siege of Newport. From 1782 to 1784 he was financial receiver of the state of New Hampshire, and in 1782 he was appointed a judge of the superior court of the state.

WHIPPOORWILL, the common name of *antrostomus vociferus* (Bonap.), a North American bird of the goatsucker family, derived from the fancied resemblance of its notes; for family and generic characters, see GOATSUCKER. It is 10 in. long and 19 in. in alar extent; the plumage is very difficult to describe, much resembling that of the European goatsucker. The bristles at the base of the bill are very stiff, more than an inch long, but without lateral filaments; wings short and rounded, second quill the longest, and tail rounded; it resembles also the chuckwill's widow (*A. Carolinensis*, Gould), but is much smaller; the female is without the white on the tail. It is distributed over the eastern United States, being replaced on the upper Missouri and to the west by *A. Nuttalli* (Cassin), smaller and lighter colored; the gape in both is very large. It is seldom seen during the day, unless startled from its repose on or near the ground; the flight is low, swift, zigzag, noiseless, and protracted, as it seeks the insects on which it feeds; according to Audubon, it always sits with its body parallel to, and never across, the branch or fence which supports it. It comes from the south in spring, returning in autumn. The notes are clear and loud for sev-

Whippoorwill (Antrostomus Nuttalli).

eral hours after sunset, and then unheard till daybreak, when it again becomes vocal until the sun has fairly risen; the first and third syllables are given with great emphasis. The eggs are laid about the middle of May on the bare ground or on dry leaves in the thickets which they frequent; they are two, much rounded, greenish white, with spots and blotches of bluish gray and light brown; both birds incubate, and the young are hatched in 14 days.

WHIP-TOM-KELLY. See VIREO.

WHIRLWIND, a general term applicable to a large class of storms. (See CYCLONE, HURRICANE, and WATER SPOUT.) In all these storms, except an occasional tornado, the air circulates with considerable regularity around a central region of calms. In some tornadoes this whirling movement is not so well marked as in others, which is explicable on the very plausible hypothesis that the axis of rotation is not invariably vertical, but is sometimes inclined or even horizontal, when the whirling mass of air rolls along like a barrel. In other tornadoes in which the whirling movement seems to be almost entirely wanting, the winds may be considered as due to a direct inrush of cooler or drier and therefore denser air, displacing and uplifting that which had previously lain near the ground. The rapid movements of tornadoes render it very difficult to obtain careful observations made simultaneously by observers on each side of the path, and of many of their features we are still in ignorance. Excellent special studies upon American tornadoes will be found in the works of Espy, Redfield, Hare, Loomis, and Chapellsmith, and the general treatise of Reye, *Wirbelstürme* (Hanover, 1872). See also the discussions in the Paris *Comptes Rendus* (1874–'5) between Faye, Peslin, and others, and the annual reports for 1873–'5 of the United States army weather bureau. In the water spout the whirling movement of the air is generally distinctly recognizable, but in the hurricane and typhoon this movement takes place on so grand a scale that it can only be demonstrated by collecting and plotting upon charts the observations made at widely separated stations. In June, 1874, Prof. Ferrel communicated to the philosophical society of Washington the mathematical expression that obtains in all whirlwinds for the relation between the barometric gradient and the velocity and direction of the wind, and his paper has been made the subject of further remarks by Hann in the journal of the Austrian meteorological society. In reference to the origin of hurricanes no more important observations could have been made than those recorded by Blanford in his memoir on the winds of northern India (London "Philosophical Transactions," 1874). This author gives in an appendix the results of his study of several hurricanes, which in substance are as follows: Cyclones are not produced between parallel currents flowing in opposite directions; a calm state of the atmosphere, or one in which the winds are light and variable over the open sea, is a favorable condition, and a second condition is a high or moderately high temperature. The consequence of this collocation will be the production and ascent of a large quantity of vapor, which will be condensed with the liberation of its latent heat over the place of its production. If this state of things last for some days, the slowly inflowing winds acquire by the influence of the rotation of the earth a whirl, in consequence of which, as Mr. Ferrel has shown, the barometric depression must increase. The last step preceding and apparently determining the formation of a well defined cyclone in the bay of Bengal is, according to Blanford, the inrush of a saturated stormy current from the southwest or west-southwest. But this last feature may be peculiar to that locality, and those previously enumerated seem to correspond best to the conditions generally observed in the formation of whirlwinds.

WHISKEY (Gaelic, *uisgue*, water, whence *usquebaugh*, water of life), a spirituous liquor distilled from grain, potatoes, or roots (as turnips or beets). Scotch and Irish whiskey is made from malt, and it is sometimes made from the same material in the United States, though more often from rye, corn, wheat, and potatoes. It is also made from oats, rice, and buckwheat. Whiskey is almost entirely produced in the countries above named. Its manufacture is described in the article DISTILLATION. Whiskey is made of various degrees of strength; when of pretty high percentage, 60 per cent. or upward, it is called highwines, or simply spirit; when purified by redistillation and of about 70 per cent. or more, it is often called Cologne spirit, and when stronger alcohol. The term whiskey is usually restricted to the first distillation, which contains more or less fusel oil, although whiskey is often made by reducing alcohol and Cologne spirit and adding flavoring extracts. Its flavor varies with the kind of grain or other material from which it is manufactured, and depends upon some of the natural principles contained in them, as well as upon products which are the result of fermentation, the principal among which is fusel oil.—In the United States and in Great Britain the tax on distilled spirits constitutes the most important source of internal revenue from manufactures. In the former country this tax was laid as early as 1791, and led to the "whiskey rebellion" in Pennsylvania. It was afterward abolished, but was renewed during the war of 1812–'15, and again during the civil war. On July 1, 1862, congress fixed the rate at 20 cts. on each gallon of distilled spirits manufactured; March 7, 1864, it was changed to 60 cts.; June 30, 1864, $1 50; Dec. 22, 1864, $2; July 20, 1868, 50 cts.; June 6, 1872, 70 cts.; March 3, 1875, 90 cts. The act of July 20, 1868, also levied a special tax of $4 a barrel, and $2 a day for every 20 bushels of grain used, and charged the distiller with the cost of gauging. The wages of storekeepers were also required by the act of March 29, 1869, to be paid by distillers. These various taxes and charges aggregated nearly 70 cts. per gallon. The special and per diem taxes were abolished by the act of 1872, and thereafter the storekeepers' wages and gaugers' fees were paid by the government. The number of gallons produced during the year ending June 30, 1875, was reported at 60,930,425; but the amount manufactured was doubtless much greater. According to the commissioner of internal revenue, the fluctuation in the actual annual production has been comparatively small, but the amount reported has varied greatly with the change of the rate of tax. Thus in 1868, when the rate was $2 a gallon, the tax collected amounted to less than $19,000,000; while in 1869, when the rate had been reduced to 50 cts., the income increased to $45,071,230, and in the following year to $55,606,094. In 1875 it was $52,081,991. The above figures embrace all distilled spirits, whether from grain or fruit, of which whiskey constitutes much the largest part, though there is no means of determining the exact proportion. The states producing the largest amounts of spirits are Illinois, the production of which in 1875 was returned at $14,111,398; Ohio, $9,958,116; Kentucky, $7,002,786; Indiana, $3,954,340; New York, $3,237,570; and Pennsylvania, $1,894,282. In the same year the exports of spirits distilled from grain amounted to 130,460 gallons, valued at $140,519.

WHIST, a game played by four persons with a full pack of 52 cards. The game is traced to that of triumph or trump, which was known in the early part of the 16th century, but was first clearly described by Edmund Hoyle in his "Short Treatise on the Game of Whist" in 1743. For nearly 120 years the literature of whist is directly traceable to this first treatise of Hoyle, though as early as 1792 there appeared in the "Sporting Magazine" an article on whist which embodies in no small degree, in a short concise set of rules, the results of the more abstruse learning of the great writers on whist of this century, beginning with Deschapelles. Rule 29 of the article in the "Sporting Magazine" might be made the primary rule of all treatises upon this noble game; for without being mindful of this rule, all labor spent in learning its science is vanity, and a constant observance of it is necessary to secure that intellectual diversion which it affords in a higher degree than any other game in which chance is an element yet known to man. The rule is a short one: "Keep your temper!" In 1839 M. Deschapelles published his *Traité du whist*, by far the most important work on the subject up to that time. But the first great step toward the consolidation of the rules and development of the modern game is to be found in the "Laws and Principles of Whist," by Cavendish (1862), and speedily followed by the works of James Clay and William Pole, and "The Laws of Short Whist," edited by J. L. Baldwin.—The game of whist as described by Hoyle, and as played for over 200 years, in which the four honors were counted, and which consisted of ten points, is now practically obsolete. The universal game in London, Paris, Vienna, Hamburg, and New York is that described by the modern writers above mentioned, and short whist is now supreme; but while in most European circles the honors are still counted, they are generally excluded from the American game, which thus becomes more one of skill. Whether this is a wise change may well be doubted, as in all whist circles the difficulty is to equalize the chances, which as between a good and bad player are very great, and perhaps the element of mere chance should, wherever possible, be retained. A new principle has latterly obtained, and is now almost universal in the best London whist circles. This is the "signal for trumps," or the playing of the highest of two indifferent cards, to show your partner that you are strong in trumps and desire him to lead them. Hitherto the efforts of all writers on the subject, and the object of many of the most important rules of the game, have been to prevent the possibility of any sign, signal, or expression, by which one partner could communicate to another the condition of his hand or his wish for a particular suit. So rigid was the rule in this respect, that it has been one of the highest offences to show by the manner of the play either that the card played is the best, or that the player is not satisfied with the lead. Yet under the auspices of Cavendish, supported by the more modern authorities, and by the acknowledged chiefs among the whist players of England, this conventional signal is not only authorized, but is commanded. On the other hand, it is expressly forbidden on the continent, and is not generally acknowledged out of London. The opponents of this signal have generally placed their objections upon grounds that are not tenable. It is not unfair, because it is admitted as a conventional rule, and is less objectionable than a signal to your partner by your finger or foot, because it is seen by your adversaries, who may gain as much information as your partner. But it is because it increases the power of good players over poor ones, already too great from the very nature of the game, and because there seems to be no greater reason for introducing this particular signal as to trumps than there is for extending it to an unlimited number of cases, until an expert player shall be enabled to determine all the most important features of his partner's hand as well as if it was before him, and because the innovation strikes at the very root of all whist philosophy, and at one blow, doubtless soon to be followed by others in the same direction, destroys the logic which for two centuries has been the alpha and omega of the game, that good players and lovers of this noble pursuit, "the instructor of youth and the consoler of age," justly oppose the introduction of any system of signals, by which the general or particular value of a hand or suit can be made known to a partner. No game of cards can be compared with whist for amusement, or for that permanent training of the mind which is considered by many able thinkers to be the chief if not the only result obtained, in a great majority of cases, from the study of the higher classics and mathematics. The following are the modern rules of the game (short whist), as originally published under the sanction of the London clubs, and now generally adopted in this country:

The rubber.—1. The rubber is the best of three games. If the first two games be won by the same players, the third game is not played. *Scoring.*—2. A game consists of five points. Each trick above six counts one point. 3. Honors, *i. e.*, ace, king, queen, and knave of trumps, are thus reckoned: If a player and his partner, either separately or conjointly hold the four honors, they score four points; any three honors, two points; only two honors, they do not score. 4. Those players who, at the commencement of a deal, are at the score of four, cannot score honors. 5. The penalty for a revoke takes precedence of all other scores. Tricks score next; honors last. 6. Honors, unless claimed before the trump card of the following deal is turned up, cannot be scored. 7. To score honors is not sufficient; they must be called at the end of the hand: if so called, they may be scored at any time during the game. 8. The winners gain: *a*, a treble, or game of three points, when their adversaries have not scored; *b*, a double, or game of two points, when their adversaries have scored less than three; *c*, a single, or game of one point, when their adversaries have scored three or four. 9. The winners of the rubber gain two points (commonly called the rubber points) in addition to the value of their games. 10. Should the rubber have consisted of three games, the value of the losers' game is deducted from the gross number of points gained by their opponents. 11. If an erroneous score be proved, such mistake can be corrected prior to the conclusion of the game in which it occurred, and such game is not concluded until the trump card of the following deal has been turned up. 12. If an erroneous score, affecting the amount of the rubber, be proved, such mistake can be rectified at any time during the rubber. *Cutting.*—13. The ace is the lowest card. 14. In all cases, every one must cut from the same pack. 15. Should a player expose more than one card, he must cut again. *Formation of table.*—16. If there are more than four candidates, the players are selected by cutting, those first in the room having the preference. The four who cut the lowest cards play first, and again cut to decide on partners; the two lowest play against the two highest; the lowest is the dealer, who has choice of cards and seats, and, having once made his selection, must abide by it. 17. When there are more than six candidates, those who cut the two next lowest cards belong to the table, which is complete with six players; on the retirement of one of those six players, the candidate who cut the next lowest card has a prior right to any aftercomer to enter the table. *Cutting cards of equal value.*—18. Two players cutting cards of equal value, unless such cards are the two highest, cut again; should they be the two lowest, a fresh cut is necessary to decide which of those two deals. 19. Three players cutting cards of equal value cut again; should the fourth (or remaining) card be the highest, the two lowest of the new cut are partners, the lower of those two the dealer; should the fourth card be the lowest, the two highest are partners, the original lowest the dealer. *Cutting out.*—20. At the end of a rubber, should admission be claimed by any one, or by two candidates, he who has or they who have played a greater number of consecutive rubbers than the others is or are out; but when all have played the same number, they must cut to decide upon the out-goers; the highest are out. *Entry and reëntry.*—21. A candidate wishing to enter a table must declare such intention prior to any of the players having cut a card, either for the purpose of commencing a fresh rubber, or of cutting out. 22. In the formation of fresh tables, those candidates who have neither belonged to nor played at any other table have the prior right of entry; the others decide their right of admission by cutting. 23. Any one quitting a table prior to the conclusion of a rubber may, with consent of the other three players, appoint a substitute in his absence during that rubber. 24. A player cutting into one table, while belonging to another, loses his right of reëntry into the latter, and takes his chance of cutting in, as if he were a fresh candidate. 25. If any one break up a table, the remaining players have the prior right to him of entry into any other; and should there not be sufficient vacancies at such other table to admit all those candidates, they settle their precedence by cutting. *Shuffling.*—26. The pack must neither be shuffled below the table nor so that the face of any card be seen. 27. The pack must not be shuffled during the play of the hand. 28. A pack, having been played with, must neither be shuffled by dealing it into packets nor across the table. 29. Each player has a right to shuffle, once only, except as provided by rule 32, prior to a deal, after a false cut, or when a new deal has occurred. 30. The dealer's partner must collect the cards for the ensuing deal, and has the first right to shuffle that pack. 31. Each player after shuffling must place the cards properly collected, and face downward, to the left of the player about to deal. 32. The dealer has always the right to shuffle last; but should a card or cards be seen during his shuffling, or while giving the pack to be cut, he may be compelled to reshuffle. *The deal.*—33. Each player deals in his turn; the right of dealing goes to the left. 34. The player on the dealer's right cuts the pack, and, in dividing it, must not leave fewer than four cards in either packet; if in cutting, or in replacing one of the two packets on the other, a card be exposed, or if there be any confusion of the cards, or a doubt as to the exact place in which the pack was divided, there must be a fresh cut. 35. When a player whose duty it is to cut has once separated the pack, he cannot alter his intention; he can neither reshuffle nor recut the cards. 36. When the pack is cut, should the dealer shuffle the cards, he loses his deal. *A new deal.*—37. There must be a new deal if, during a deal, or during the play of a hand, the pack be proved incorrect or imperfect; or if any card, excepting the last, be faced in the pack. 38. If, while dealing, a card be exposed by the dealer or his partner, should neither of the adversaries have touched the cards, the latter can claim a new deal; a card exposed by either adversary gives that claim to the dealer, provided that his partner has not touched a card; if a new deal does not take place, the exposed card cannot be called. 39. If, during dealing, a player touch any of his cards, the adversaries may do the same, without losing their privilege of claiming a new deal, should chance give them such option. 40. If, in dealing, one of the last cards be exposed, and the dealer turn up the trump before there is reasonable time for his adversaries to decide as to a fresh deal, they do not thereby lose their privilege. 41. If a player, while dealing, look at the trump card, his adversaries have a right to see it, and may exact a new deal. 42. If a player take into the hand dealt to him a card belonging to the other pack, the adversaries, on discovery of the error, may decide whether they will have a fresh deal or not. *A misdeal.*—43. A misdeal loses the deal. 44. It is a misdeal: *a*, unless the cards are dealt into four packets, one at a time in regular rotation, beginning with the player to the dealer's left; *b*, should the dealer place the last (*i. e.*, the trump) card, face downward, on his own or any other packet; *c*, should the trump card not come in its regular order to the dealer, but he does not lose his deal if the pack be proved imperfect; *d*, should a player have fourteen cards, and either of the other three less than thirteen; *e*, should the dealer, under an impression that he has made a mistake, either count the cards on the table, or the remainder of the pack; *f*, should the dealer deal two cards at once, or two cards to the same hand, and then deal a third; but if, prior to dealing that third card, the dealer can, by altering the position of one card only, rectify such error, he may do so, except as provided by the second clause of this law; *g*, should the dealer omit to have the pack cut to him, and the adversaries discover the error, prior to the trump card being turned up, and before looking at their cards, but not after having done so. 45. A misdeal does not lose the deal if, during the dealing, either of the adversaries touch the cards prior to the dealer's partner having done so; but should the latter have first interfered with the cards, notwithstanding either or both of the adversaries have subsequently done the same, the deal is lost. 46. Should three players have their right number of cards, and the fourth have less than thirteen, and not discover such deficiency until he has played any of his cards, the deal stands good; should he have played, he is answerable for any revoke he may have made as if the missing card or cards had been in his hand; he may search the other pack for it or them. 47. If a pack, during or after a rubber, be proved incorrect or imperfect, such proof does not alter any past score, game, or rubber; that hand in which the imperfection was detected is null and void; the dealer deals again. 48. Any one dealing out of turn, or with the adversary's cards, may be stopped before the trump card is turned up, after which the game must proceed as if no mistake had been made. 49. A player can neither shuffle, cut, nor deal for his partner without the permission of his opponents. 50. If the adversaries interrupt a dealer while dealing, either by questioning the score or asserting that it is not his deal, and fail to establish such claim, should a misdeal occur, he may deal again. 51. Should a player take his partner's deal and misdeal, the latter is liable to the usual penalty, and the adversary next in rotation to the player who ought to have dealt then deals. *The trump card.*—52. The dealer, when it is his turn to play to the first trick, should take the trump card into his hand; if left on the table after the first trick be turned and quitted, it is liable to be called; his partner may at any time remind him of the liability. 53. After the dealer has taken the trump card into his hand, it cannot be asked for; a player naming it at any time during the play of that hand is liable to have his highest or lowest trump called. 54. If the dealer take the trump card into his hand before it is his turn to play, he may be desired to lay it on the table; should he show a wrong card, this card may be called, as also a second, a third, &c., until the trump card be produced. 55. If the dealer declare himself unable to recollect the trump card, his highest or lowest trump may be called at any time during that hand, and, unless it cause him to revoke, must be played; the call may be repeated, but not changed, *i. e.*, from highest to lowest, or *vice versa*, until such card is played. *Cards liable to be called.*—56. All exposed cards are liable to be called, and must be left on the table; but a card is not an exposed card when dropped on the floor or elsewhere below the table. The following are exposed cards: *a*, two or more cards played at once; *b*, any card dropped with its face upward, or in any way exposed on or above the table, even though snatched up so quickly that no one can name it. 57. If any one play to an imperfect trick the best card on the table, or lead one which is a winning card as against his adversaries, and then lead again, or play several such winning cards, one after the other, without waiting for his partner to play, the latter may be called on to win, if he can, the first or any other of those tricks, and the other cards thus improperly played are exposed cards. 58. If a player, or players, under the impression that the game is lost or won, or for other reasons, throw his or their cards on the table face upward, such cards are exposed, and liable to be called, each player's by the adversary; but should one player alone retain his hand, he cannot be forced to abandon it. 59. If all four players throw their cards on the table face upward, the hands are abandoned, and no one can again take up his cards. Should this general exhibition show that the game might have been saved or won, neither claim can be entertained unless a revoke be established. The revoking players are then liable to the following penalties: they cannot under any circumstances win the game by the result of that hand, and the adversaries may add three to their score, or deduct three from that of the revoking players. 60. A card detached from the rest of the hand so as to be named is liable to be called; but should the adversary name a wrong card, he is liable to have a suit called when he or his partner has the lead. 61. If a player who has rendered himself liable to have the highest or lowest of a suit called fail to play as desired, or if when called on to lead one suit he lead another, having in his hand one or more cards of that suit demanded, he incurs the penalty of a revoke. 62. If any player lead out of turn, his adversaries may either call the card erroneously led, or may call a suit from him or his partner when it is next the turn of either of them to lead. 63. If any player lead out of turn, and the other three have followed him, the trick is complete, and the error cannot be rectified; but if only the second, or the second and third, have played to the false lead, their cards, on discovery of the mistake, are taken back: there is no penalty against any one excepting the original offender, whose card may be called, or he or his partner, when either of them has next the lead, may be compelled to play any suit demanded by the adversaries. 64. In no case can a player be compelled to play a card which would oblige him to revoke. 65. The call of a card may be repeated until such card has been played. 66. If a player called on to lead a suit have none of it, the penalty is paid. *Cards played in error, or not played to a trick.*—67. If the third hand play before the second, the fourth hand may play before his partner. 68. Should the third hand not have played, and the fourth play before his partner, the latter may be called on to win, or not to win, the trick. 69. If any one omit playing to a former trick, and such error be not discovered until he has played to the next, the adversaries may claim a new deal; should they decide that the deal stand good, the surplus card at the end of the hand is considered to have been played to the imperfect trick, but does not constitute a revoke therein. 70. If any one play two cards to the same trick, or mix his trump or other card with a trick to which it does not properly belong, and the mistake be not discovered until the hand is played out, he is answerable for all consequent revokes he may have made. If, during the play of the hand, the error be detected, the tricks may be counted face downward, in order to ascertain whether there be among them a card too many; should this be the case, they may be searched, and the card restored; the player is, however, liable for all revokes which he may have meanwhile made. *The revoke.*—71. A revoke is when a player, holding one or more cards of the suit led, plays a card of a different suit. 72. The penalty for a revoke—*a*, is at the option of the adversaries, who at the end of the hand may either take three tricks from the revoking player, or deduct three points from his score, or add three to their own score; *b*, can be claimed for as many revokes as occur during the hand; *c*, is applicable only to the score of the game in which it occurs; *d*, cannot be divided, *i. e.*, a player cannot add one or two to his own score and deduct one or two from the revoking player; *e*, takes precedence of every other score: *e. g.*, the claimants two, their opponents nothing; the former add three to their score, and thereby win a treble game, even should the latter have made thirteen tricks and held four honors. 73. A revoke is established if the trick in which it occur be turned and quitted, *i. e.*, the hand removed from that trick after it has been turned face downward on the table, or if either the revoking player or his partner, whether in his right turn or otherwise, lead or play to the following trick. 74. A player may ask his partner whether he has not a card of the suit which he has renounced; should the question be asked before the trick is turned and quitted, subsequent turning and quitting does not establish the revoke, and the error may be corrected, unless the question be answered in the negative, or unless the revoking player or his partner have led or played to the following trick. 75. At the end of the hand, the claimants of a revoke may search all the tricks. 76. If a player discover his mistake in time to save a revoke, the adversaries, whenever they think fit, may call the card thus played in error, or may require him to play his highest or lowest card to that trick in which he has renounced; any player or players who have played after him may withdraw their cards and substitute others; the cards withdrawn are not liable to be called. 77. If a revoke be claimed, and the accused player or his partner mix the cards before they have been sufficiently examined by the adversaries, the revoke is established. The mixing of the cards only renders the proof of a revoke difficult, but does not prevent the claim and possible establishment of the penalty. 78. A revoke cannot be claimed after the cards have been cut for the following deal. 79. The revoking player and his partner may, under all circumstances, require the hand in which the revoke has been detected to be played out. 80. If a revoke occur, and be claimed and proved, bets on the odd trick, or on amount of score, must be decided by the actual state of the latter, after the penalty is paid. 81. Should the players on both sides subject themselves to the penalty of one or more revokes, neither can win the game; each is punished at the discretion of his adversary. 82. In whatever way the penalty be enforced, under no circumstances can a player win the game by the result of the hand during which he has revoked; he cannot score more than four. (See rule 61). *Calling for new cards.*—83. Any player (on paying for them) before, but not after, the pack has been cut for the deal, may call for fresh cards. He must call for two new packs, of which the dealer takes his choice. *General rules.*—84. Where a player and his partner have an option of exacting from their adversaries one of two penalties, they should agree who is to make the election, but must not consult with one another which of the two penalties it is advisable to exact; if they do so consult, they lose their right; and if either of them, with or without consent of his partner, demand a penalty to which he is entitled, such decision is final. This rule does not apply in exacting the penalties for a revoke; partners have then a right to consult. 85. Any one during the play of a trick, or after the four cards are played, and before (but not after) they are touched for the purpose of gathering them together, may demand that the cards be placed before their respective players. 86. If any one, prior to his partner playing, should call attention to the trick—either by saying that it is his, or by naming his card, or, without being required so to do, by drawing it toward him—the adversaries may require that opponent's partner to play the highest or lowest of the suit then led, or to win or lose the trick. 87. In all cases where a penalty has been incurred, the offender is bound to give reasonable time for the decision of his adversaries. 88. If a bystander make any remark which calls the attention of a player or players to an oversight affecting the score, he is liable to be called on, by the players only, to pay the stakes and all bets on that game or rubber. 89. A bystander, by agreement among the players, may decide any question. 90. A card or cards torn or marked must be either replaced by agreement, or new cards called at the expense of the table. 91. Any player may demand to see the last trick turned, and no more. Under no circumstances can more than eight cards be seen during the play of the hand, viz.: the four cards on the table which have not been turned and quitted, and the last trick turned.—*Etiquette of Whist.* The following rules belong to the established etiquette of whist. They are not called laws, as it is difficult, in some cases impossible, to apply any penalty to their infraction, and the only remedy is to cease to play with players who habitually disregard them. Two packs of cards are invariably used at clubs: if possible this should be adhered to. Any one, having the lead and several winning cards to play, should not draw a second card out of his hand until his partner has played to the first trick, such act being a distinct intimation that the former has played a winning card. No intimation whatever, by word or gesture, should be given by a player as to the state of his hand, or of the game. A player who desires the cards to be placed, or who demands to see the last trick, should do it for his own information only, and not in order to invite the attention of his partner. No player should object to refer to a bystander who professes himself uninterested in the game, and able to decide any disputed question of facts, as to who played any particular card, whether honors were claimed though not scored, or *vice versa*, &c. It is unfair to revoke purposely; having made a revoke, a player is not justified in making a second in order to conceal the first. Until the players have made such bets as they wish, bets should not be made with bystanders. Bystanders should make no remark, neither should they by word or gesture give any intimation of the state of the game until concluded and scored, nor should they walk round the table to look at the different hands. No one should look over the hand of a player against whom he is betting.—*Dummy* is played by three players. One hand, called dummy's, lies exposed on the table. The laws are the same as those of whist, with the following exceptions: 1. Dummy deals at the commencement of each rubber. 2. Dummy is not liable to the penalty for a revoke, as his adversaries see his cards; should he revoke and the error not be discovered until the trick is turned and quitted, it stands good. 3. Dummy being blind and deaf, his partner is not liable to any penalty for an error whence he can gain no advantage. Thus, he may expose some or all of his cards, or may declare that he has the game or trick, &c., without incurring any penalty; if, however, he lead from dummy's hand when he should lead from his own, or *vice versa*, a suit may be called from the hand which ought to have led. Double dummy is played by two players, each having a dummy or exposed hand for his partner. The laws of the game do not differ from dummy whist, except in the following special law: There is no misdeal, as the deal is a disadvantage.

WHISTLER, George Washington, an American engineer, born at Fort Wayne, Ind., May 19, 1800, died in St. Petersburg, April 7, 1849. He graduated at West Point in 1819, became second lieutenant of artillery, and in 1821–'2 was assistant teacher of drawing at the military academy. He was then detailed for duty on the northern boundary commission under Col. J. J. Abert, and served till 1828. In 1829 he became first lieutenant, and went to Europe in the employ of the Baltimore and Ohio railroad company. Between 1831 and 1842 he superintended the construction of the Paterson and Hudson River, the Boston and Providence, and the Stonington and Providence railroads, and the Western railroad through Massachusetts. He resigned his commission in 1833. In 1842 he was invited to superintend the system of internal improvements then projected in Russia, where not only the railroads were to be constructed, but the rails and the rolling stock were to be manufactured under his supervision. He was also appointed engineer of the naval arsenal at Cronstadt, and engaged in the construction of fortifications, docks, and bridges, and the improvement of harbors and rivers.

WHISTLER, James A. M. See supplement.

WHISTON, William, an English clergyman, born at Norton, Leicestershire, Dec. 9, 1667, died in London, Aug. 22, 1752. He graduated at Cambridge in 1690, and in 1694 was appointed chaplain to the bishop of Norwich. In 1696 he published his "New Theory of the Earth," in support of the Mosaic account. He was appointed rector of Lowestoft in 1698, but returned to the university in 1701 as deputy professor of mathematics. He succeeded Newton as professor in 1703, and expounded and defended the Newtonian philosophy in his *Prælectiones Physico-Mathematicæ* (1710; translated and published under the title "New ton's Mathematical Philosophy demonstrated," 1716). He had also attained eminence as a preacher, when he adopted Arianism, rejected infant baptism, and began to omit portions of the litany. The bishop of Ely requested him not to fulfil the duties of the Boyle lectureship, in which he was making his views public, but allowed the continuance of the salary. Whiston resigned the lectureship, and in 1710, after several hearings before the heads of the houses, was deprived of his professorship and expelled from the university. He removed to London, where he published his "Primitive Christianity" (5 vols., 1711–'12). For five years repeated attempts were made to convict him of heresy; but he reiterated his opinions in his "Brief History of the Revival of the Arian Heresy in England" (1711), "Athanasius convicted of Forgery" (1712), and "Three Essays" on Trinitarianism (1713). A subscription amounting to £470 was made for him in 1721; and he also derived an income from reading astronomical and philosophical lectures. He subsequently published "An Essay toward restoring the true Text of the Old Testament," containing translations of the passages in which the Samaritan Pentateuch differs from the Hebrew (1722); "Collection of Authentick Records belonging to the Old and New Testament" (2 vols., 1727–'8); "The Primitive New Testament" (1745); and "The Sacred History of the Old and New Testament" (6 vols., 1745). He finally became a Baptist, gathered a religious society at his own house, and believed that the millennium was to begin in 1766, when the Jews would be restored. His works on prophecy include an "Essay on the Revelation of St. John" (Cambridge, 1706), "The Accomplishment of Scripture Prophecies" (1708), and "The Literal Accomplishment of Scripture Prophecies" (1724). He published an autobiography (2 vols., 1749–'50), and made a translation of Josephus (fol., 1737), which, though not accurate, is still reprinted.

WHITAKER, John, an English clergyman, born in Manchester about 1735, died at Ruan-Langhorne, Cornwall, Oct. 30, 1808. He was educated at Oxford, and became a fellow of Corpus Christi college. In 1771 he published a "History of Manchester" (enlarged eds., 2 vols., 1773, and 3 vols., 1775). In refutation of Macpherson's theory that the modern highlanders are descendants of the Caledonians of Tacitus, he wrote his "Genuine History of the Britons" (1772), maintaining that they represent a subsequent Irish colonization. In 1773 he was made morning preacher at Berkeley chapel, London, but in two months was removed. In 1778 he became rector of Ruan-Langhorne. His works include "Sermons upon Death, Judgment, Heaven, and Hell" (8vo, 1783); "Mary, Queen of Scots, vindicated" (3 vols. 8vo, 1787; enlarged ed., 2 vols. 8vo, 1790); "The Origin of Arianism disclosed" (8vo, 1791); "The Course of Hannibal over the Alps ascertained" (2 vols. 8vo, 1794); "The Ancient Cathedral of Cornwall historically surveyed" (2 vols. 4to, 1804); and "The Life of St. Neot" (1809).

WHITBREAD, Samuel, an English statesman, born in London in 1758, committed suicide July 6, 1815. He was educated at Cambridge, and sat in parliament from 1790 till his death. He was a leader of the whigs, and conducted the impeachment of Lord Melville. He took an active part in the affairs of Drury Lane theatre, and the troubles in which it was involved were thought to have brought on the derangement which led to his suicide.

WHITBY, a town and port of entry of the province of Ontario, Canada, capital of Ontario co., on Lake Ontario, at the S. terminus of the Whitby and Port Perry railway, and on the Grand Trunk line, 30 m. E. by N. of Toronto; pop. in 1871, 2,732. The harbor is one of the best on the lake. There are manufactories of iron castings, mill machinery, agricultural implements, musical instruments, leather, &c., three branch banks, a grammar and several common schools, a weekly newspaper, and churches of five denominations. The value of imports for the year ending June 30, 1874, was $77,781; of exports, $478,860.

WHITBY, Daniel, an English clergyman, born at Rushden, Northamptonshire, in 1638, died in Salisbury, March 24, 1726. He was educated at Oxford, became a fellow in 1664, took orders, and was a prominent writer against popery. He became prebendary of Salisbury in 1668, precentor in 1672, and rector of St. Edmund's. In 1683 he published anonymously "The Protestant Reconciler," a plea for a fuller communion between churchmen and dissenters. It was condemned by the university of Oxford to be burned, and the author was obliged to retract its main principles. His most important work is "A Paraphrase and Commentary on the New Testament" (2 vols. fol., 1703), which is still in esteem as an Arminian exposition. In connection with this he afterward produced "The Necessity and Usefulness of the Christian Revelation" (8vo, 1705). In 1710 he published a treatise "Concerning the True Import of the Words Election and Reprobation," often reprinted as "Whitby on the Five Points." He gradually became a convert to Arianism, and defended his new opinions in a Latin treatise against the authority of the fathers in theological controversy (1714), and other works. His "Last Thoughts" was published posthumously with a biography by Dr. Sykes (1728).

WHITE. See COLOR.

WHITE, the name of five counties in the United States. **I.** A N. county of Georgia, drained by the head waters of the Chattahoochee river; area, about 250 sq. m.; pop. in 1870, 4,606, of whom 564 were colored. The surface is undulating and the soil fertile. The chief productions in 1870 were 8,148 bushels of wheat, 80,811 of Indian corn, 8,007 of oats, 8,899 of sweet potatoes, 22,475 lbs. of butter, 4,076 of wool, and 4,686 of tobacco. There were 486 horses, 205 mules and asses, 784 milch cows, 1,314 other cattle, 2,341 sheep, and 4,177 swine. Capital, Cleveland. **II.** A central county of Arkansas, bounded E. by White river and intersected by Little Red river and Bayou des Arc; area, 1,044 sq. m.; pop. in 1870, 10,347, of whom 1,200 were colored. The surface is undulating and partly occupied by dense forests. Large quantities of lumber are exported. The Cairo and Fulton railroad traverses it. The chief productions in 1870 were 5,567 bushels of wheat, 323,603 of Indian corn, 21,039 of oats, 11,613 of Irish and 21,816 of sweet potatoes, 75,875 lbs. of butter, 6,880 of wool, 8,217 of tobacco, and 4,925 bales of cotton. There were 2,096 horses, 3,192 milch cows, 5,714 other cattle, 3,933 sheep, and 21,586 swine. Capital, Searcy. **III.** A central county of Tennessee, bounded S. and S. W. by the Caney fork of Cumberland river; area, 672 sq. m.; pop. in 1870, 9,375, of whom 1,080 were colored. The surface is hilly and diversified by fine forests. The chief productions in 1870 were 55,181 bushels of wheat, 347,944 of Indian corn, 22,129 of oats, 11,005 of Irish and 13,305 of sweet potatoes, 92,316 lbs. of butter, 21,816 of tobacco, 15,735 of wool, and 84 bales of cotton. There were 2,345 horses, 2,122 milch cows, 3,975 other cattle, 8,144 sheep, and 17,340 swine. Capital, Sparta. **IV.** A N. W. county of Indiana, intersected by the Tippecanoe river; area, 504 sq. m.; pop. in 1870, 10,554. The surface is mostly level and the soil very fertile. The Louisville, New Albany, and Chicago, and the Pittsburgh, Cincinnati, and St. Louis railroads pass through it. The chief productions in 1870 were 173,312 bushels of wheat, 14,650 of rye, 215,808 of Indian corn, 119,424 of oats, 55,687 of potatoes, 227,304 lbs. of butter, and 20,994 tons of hay. There were 4,292 horses, 3,701 milch cows, 10,430 other cattle, 13,620 sheep, and 7,292 swine; 3 flour mills, and 2 woollen mills. Capital, Monticello. **V.** A S. E. county of Illinois, separated from Indiana by the Wabash river, and intersected by the Little Wabash; area, 480 sq. m.; pop. in 1870, 16,846. It is diversified by prairie and woodland, and has a very fertile soil. The Cairo and Vincennes, the Springfield and Illinois Southeastern, and the St. Louis and Southeastern railroads traverse it. The chief productions in 1870 were 184,321 bushels of wheat, 870,521 of Indian corn, 119,653 of oats, 27,291 of potatoes, 142,362 lbs. of butter, 135,045 of tobacco, 42,702 of wool, and 6,056 tons of hay. There were 4,696 horses, 1,022 mules and asses, 3,697 milch cows, 4,787 other cattle, 17,085 sheep, and 24,765 swine; 8 manufactories of carriages and wagons, 7 flour mills, and 7 saw mills. Capital, Carmi.

WHITE, Andrew Dickson, an American scholar, born at Homer, N. Y., Nov. 7, 1832. He graduated at Yale college in 1853, studied for two years in Europe, and in 1857 was elected professor of history in the university of Michigan. In 1862 he resigned on account of ill health, and was elected to the New York state senate from Syracuse, and reëlected in 1864. In 1866 he became president of Cornell university, the establishment of which he had greatly promoted, and in 1868 visited Europe to examine the organization and management of the leading schools of agriculture and technology, and to purchase books and apparatus. From his own resources he has contributed upward of $100,000 to the equipment of the institution. Besides being president, he is professor of modern history. In 1871 he was one of the government commissioners sent to Santo Domingo to study the question of annexing that country. He has published "A Syllabus of Modern History," "The Warfare of Science" (New York, 1876), and many addresses and pamphlets, including "A Word from the Northwest" (London, 1862), in response to strictures in the American "Diary" of Dr. W. H. Russell.

WHITE, Gilbert, an English naturalist, born at Selborne, Hampshire, July 18, 1720, died in Oxford, June 26, 1793. He was educated at Oxford, and was made senior proctor of the university in 1752. At an early period of his life he retired to his native village, where he devoted himself to natural history. His "Natural History of Selborne" (4to, 1789; last ed., with notes by Frank Buckland, London, 1875) is one of the English classics. After his death was published "A Naturalist's Calendar, with Observations in various Branches of Natural History," edited from his papers by Dr. Aikin (1795). A complete edition of his works was published by W. Markwick (2 vols. 8vo, 1802), and in 1876 ten of his unpublished letters were edited by J. E. Harting.

WHITE, Henry Kirke, an English poet, born in Nottingham, March 21, 1785, died in Cambridge, Oct. 19, 1806. He was the son of a butcher, and assisted his father until his 14th year, but learned French and began to write verses. He was apprenticed to a stocking weaver, but after a year was placed in an attorney's office, and besides the study of law applied himself to the Latin, Greek, Italian, Spanish, and Portuguese languages, to some of the sciences, to drawing, and to playing the piano. He began to write for magazines in his 15th year, obtained several prizes, and published "Clifton Grove and other Poems" (1803). Becoming converted from religious indifference to earnest Christian faith, he sought a university education for the purpose of entering the ministry. In 1804 he obtained a sizarship at St. John's college, Cambridge, where for two years he was at the head of his class. He was then appointed a tutor in mathematics; but he had destroyed his health by too much study, and after a visit to London he returned to the college to die of consumption. A tablet to his memory, with a medallion by Chantrey, was placed in All Saints' church, Cambridge, by Francis Boott, an American. Robert Southey published "The Remains of Henry Kirke White, with an Account of his Life" (2 vols., 1807; supplementary volume, 1822).

WHITE, Joseph Blanco, an English author, born in Seville, Spain, July 11, 1775, died in Liverpool, May 20, 1841. His grandfather, an Irishman, settled in Seville, became a successful merchant, and was ennobled; his father married a wealthy lady of rank. Blanco at the age of 12 was sent to college to be educated for the Roman Catholic priesthood. He was ordained a priest in 1799, but soon conceived a dislike for the profession, and in 1810 went to England, where he passed the remainder of his life. He conducted in London a Spanish periodical, entitled *El Español*, from 1810 to 1814, when he received from the English government a life pension of £250. He then joined the church of England, and his religious opinions subsequently passed through various phases. He conducted from 1822 to 1825 a Spanish quarterly entitled *Las Variedades*, edited the "London Review" during its existence of six months (1829), and published "Letters from Spain" (1822); "Practical and Internal Evidence against Catholicism" (1825); "The Poor Man's Preservative against Popery" (1825); and "Second Travels of an Irish Gentleman in Search of a Religion" (2 vols., 1833), in answer to the work of Moore. His most celebrated production is a sonnet entitled "Night." His autobiography was edited by J. H. Thom (3 vols., London, 1845).

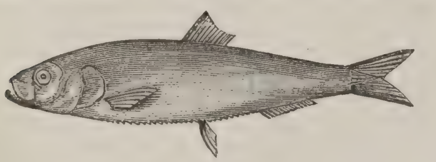
WHITE, Peregrine, the first child born in New England of English parents, born on board the Mayflower, in the harbor of Cape Cod, about Dec. 10 (O. S.), 1620, died in Marshfield, July 20, 1704. He was the son of William and Susannah White, and received on account of his birth 200 acres of land from the general court. He filled various civil and military offices.

WHITE, Richard Grant, an American author, born in New York, May 22, 1822. He graduated at the university of New York in 1839, studied medicine and law, was admitted to the bar, and became a writer for the "Courier and Enquirer" newspaper and for other journals. He has published "A Biographical and Critical Hand Book of Christian Art" (1853); "Shakespeare's Scholar" (1854); a variorum edition of Shakespeare, with a memoir and a critical essay (12 vols., 1857–'62); "Essay upon the Authorship of the Three Parts of Henry VI." (1859); "National Hymns," an essay embodying hymns written for a prize of $600 offered by a national committee (1861); "The New Gospel of Peace, according to St. Benjamin," a political satire, published anonymously (in four books, 1863–'6); "Memoirs of the Life of William Shakespeare, with an Essay toward the Expression of his Genius" (8vo, 1865); and "Words and their Uses" (1870; revised ed., 1872). He has edited "The Book Hunter" (1863), and "Poetry of the Civil War" (1866), and is the author of the "Yankee" letters in the London "Spectator" from 1863 to 1867.

WHITE, William, an American bishop, born in Philadelphia, April 6, 1748, died there, July 17, 1836. He graduated at the college of Philadelphia in 1765, studied theology, was ordained deacon in England in 1770 and priest in 1772, and became assistant minister and afterward rector of Christ church and St. Peter's church, Philadelphia. In 1777 he was elected chaplain to congress. In 1786 he was elected bishop of Pennsylvania, and was consecrated by the archbishop of Canterbury, Feb. 4, 1787. He presided over the convention held in 1789 for the organization of the Protestant Episcopal church in the United States, and wrote the constitution of the church. With Bishop Seabury he had the chief part in revising the "Book of Common Prayer." He wrote "Memoirs of the Protestant Episcopal Church," "Comparative Views of the Controversy between the Calvinists and Arminians," "Commentary on the Ordination Services," and "Lectures on the Catechism." His life was written by Dr. B. Wilson (Philadelphia, 1839).

WHITE ANT. See Termites.

WHITEBAIT (*clupea alba*, Yarr.), a small fish of the herring family, in great repute with London epicures. It has teeth on the palate and pterygoid bones, on the vomer, and on the tongue, for which reason Valenciennes established for it the genus *rogenia;* the scales are very soft, small, and thin. It is from 3 to 6 in. long, according to age, pale ashy green above, sides and lower parts unspotted white at all seasons. It ascends the Thames to deposit its spawn in the spring; the fishery begins in April and continues to September, and is prosecuted by means of nets; the fish are caught in abundance at every flood tide. Their food seems to consist of minute crustaceans. Every year there is a ministerial whitebait dinner at Greenwich, just before the prorogation of parliament.



Whitebait.

WHITE BEAR. See Bear.

WHITE BRETHREN. See Brethren, White.

WHITEFIELD, George, an English clergyman, born in Gloucester, Dec. 16, 1714, died in Newburyport, Mass., Sept. 30, 1770. He was the orphan of an innkeeper, and was educated first at a grammar school. While assisting his mother about the inn, he composed sermons, and fasted twice a week for 36 hours together. At the age of 18 he entered Pembroke college, Oxford, as a servitor. There he became intimate with Charles Wesley, was an enthusiastic member of the club in which the denomination of Methodists took its rise, and cultivated extreme habits of asceticism. The bishop of Gloucester ordained him deacon, June 20, 1736, and the next Sunday he preached with such extraordinary effect that a complaint was made to the bishop that he had driven 15 persons mad. Returning to Oxford, he took his degree of B. A., and in 1737 went to London to preach at the tower chapel. He afterward filled for a few months a curacy in Hampshire, and in December, 1737, was induced by letters from John Wesley in Georgia to embark for America. In September, 1738, he returned to England to collect funds for a proposed orphan asylum near Savannah. Soon after he reached home he and Wesley entered in earnest upon the missionary career from which the origin of Methodism is dated. On Feb. 17, 1739, Whitefield set the example of preaching in the open air in a field near Bristol. From this time he travelled continually, preaching to enormous crowds with marvellous results. In 1739 he went back to his orphan house in Georgia. He afterward visited New England, preached to 20,000 persons on Boston common, and in January, 1741, returned to England. He disagreed with Wesley on predestination, and the Calvinistic and Wesleyan Methodists have ever since remained distinct bodies. (See Methodism, vol. xi., p. 453.) In 1744 he made a third voyage to America, landing at York, Me. He met at first with great opposition in New England, Harvard college issuing a "testimony" against him, and many of the clergy being equally hostile. Before he set out for Georgia, however, he had converted 20 pastors. In 1748 he went to the Bermudas for his health, and thence returned to England. After successful tours in Ireland and Scotland, he was again in Georgia and South Carolina in 1751–'2, and in 1754 made a fifth voyage thither, accompanied by a number of children for his orphan house. His tour extended from Georgia to New Hampshire, and he spoke of it as the most important of all his expeditions. He returned to London in May, 1755, and soon after again visited Scotland and Ireland. In Dublin he was assaulted by a mob, and severely wounded with stones. In 1761–'2 ill health obliged him to desist in a measure from outdoor preaching, and he visited Holland. He made his sixth American tour in 1763–'5. His last sojourn in England, 1765–'9, was of incalculable advantage to Methodism. He consecrated new chapels provided by the countess of Huntingdon, greatly promoted the success of her training college at Travecca, influenced his associates to counsel with the Wesleyan branch of the revival movement, and strove to bring about a peaceful reconciliation of the Calvinistic and Arminian elements. In September, 1769, he started on his seventh American tour. He preached for two hours at Exeter, N. H., the day before his death, and on his arrival at Newburyport the same evening addressed the crowd that came to meet him. He died of asthma, and was buried beneath the pulpit of the Federal street church in Newburyport. In 1741 he married a widow, whose death in 1768, according to his friend Winter, "set his mind much at rest." She bore him a son, who died an infant.—Whitefield was tall in person; his features were regular, and his eyes small, blue, and luminous; one of them had a slight cast. His voice was marvellously rich, sweet, and sonorous. His eloquence has been rarely surpassed. His style was severely simple, and in his printed sermons seems even meagre. He never fell into vulgarity, but delighted in odd illustrations, anecdotes, local allusions, colloquial phrases, and the language of the common people. A collection of his sermons, tracts, and letters was published in London in 1771 (6 vols. 8vo), and his journals were printed during his lifetime (2d ed., 1756).—See John Gillies, "Memoirs of the Life of the Rev. George Whitefield" (London, 1772); Robert Philip, "Life and Times of Whitefield" (1838); and the Rev. Abel Stevens, "History of the Religious Movement of the 18th Century called Methodism" (New York, 1859–'62).

WHITE FISH (*coregonus albus*, Lesueur), a valuable member of the salmon family, peculiar to North America. It is found in the great lakes from Lake Erie to the Arctic sea, in Lake Champlain, in the smaller lakes of Canada connected with the St. Lawrence on the S. side, and in the Mackenzie, Coppermine, and other rivers flowing into the icy sea, even as low down as brackish water. The mouth is small and without teeth, the body elongated but thick, head small and pointed, tail forked, first dorsal not so long as high in front, and scales large. It attains a length of 1½ to 2½ ft., and a weight of 3 to 10 lbs., in the clear waters of Lake Superior becoming very large and fat; its general appearance is shad-like, whence it is called lake shad at Burlington, Vt. It is bluish gray on the back, lighter on the sides, and white below. In October they enter the rivers from the lakes to spawn, usually returning in three or four weeks; they are gregarious, and move from place to place according to the supply of food, which consists of insects and larvæ, tender aquatic plants, soft-shelled mollusks, and occasionally small fishes; they die very quickly when taken out of the water. They are caught principally by gill nets, most abundantly when spread under the ice. The flesh is bluish white, changing when boiled to pure opaque white, whence the name.

WHITEHALL, a town and village of Washington co., New York, at the head of Lake Champlain, on the Rensselaer and Saratoga and New York and Canada railroads, 65 m. N. N. E. of Albany; pop. of the town in 1870, 5,564; of the village, 4,322; of the town in 1875, 5,039. It is connected with Troy by the Champlain canal. The village is situated at the entrance of Wood creek and Pawlet river into the lake, and steamboats ply daily during the summer between it and the other lake ports. The falls in the streams furnish ample water power. The principal manufacturing establishments are three saw and planing mills, three machine shops, a door factory, and seven boat-building establishments. There are six large lumber firms, and three banks. Two weekly newspapers are published. The village contains a graded free school, and Baptist, Episcopal, Methodist, Presbyterian, and Roman Catholic (one French and one Irish) churches.—The town was first settled in 1761 by Major Philip Skene, who gave it the name of Skenesborough. The name was changed to Whitehall in 1786. The Champlain canal was constructed from this point to Fort Edward in 1819, and completed to Troy in 1824.

WHITEHAVEN, a seaport and market town of Cumberland, England, on a small creek of the Irish sea, 33 m. S. W. of Carlisle; pop. in 1871, 18,446. It is built at the foot of high hills and has a good harbor. The principal articles of export are coal, iron, and iron ore. The coal mines extend under the town and for more than two miles under the sea. There are manufactories of cotton, linen, iron and earthen ware, bricks, &c.

WHITEHEAD, William, an English poet, born in Cambridge in 1715, died in London, April 14, 1785. He was educated at Winchester school and at Cambridge, and became fellow of Clare hall. In 1741 he published an "Epistle on the Danger of Writing Verse." In 1745 he wrote his tragedy of "The Roman Father," founded partly upon the *Horace* of Corneille, which was brought out at Drury Lane in 1750. His "Creüsa, Queen of Athens," was brought out in 1754. In 1758 he was made poet laureate. In 1762 he produced a comedy, "The School for Lovers," and in 1770 a farce, "The Trip to Scotland." His productions were twice printed under his own supervision (1754 and 1774). His friend Mason published a third edition in 1788, with a biography.

WHITE LEAD. See LEAD, vol. x., p. 245.

WHITELOCKE, Bulstrode, an English statesman, born in London, Aug. 2, 1605, died at Chilton, Wiltshire, Jan. 28, 1676. He was the son of Sir James Whitelocke, judge of the common pleas, was educated at Oxford, entered the Middle Temple, and in 1640 was elected to the long parliament. He was chairman of the committee for managing the impeachment of the earl of Strafford. In 1642 he was made deputy lieutenant of Buckinghamshire and Oxfordshire, and with Hampden dispersed the commissioners of array assembled at Watlington. In November, 1642, he was present at the defence of Brentford; subsequently was one of the commissioners sent to Oxford to treat for peace; and was a member of the Westminster assembly, where he opposed the adoption of Presbyterianism. In 1644 he was appointed governor of Windsor castle. In 1645 he opposed the self-denying ordinance, became one of the commissioners of the admiralty, and a member of the commission sent to Uxbridge to negotiate with Charles. He refused to join in drawing up the charges against Charles, though named one of the members for that purpose, and disapproved of the proceedings at the king's trial. He was afterward for a time one of the commissioners of the great seal, and held several other offices, and in September, 1653, was appointed ambassador to Sweden, where he made a satisfactory treaty. In August, 1654, he was elected to Cromwell's second parliament; and on its dissolution he was made commissioner of the treasury, and subsequently one of the council of trade. In December, 1657, he was called to Cromwell's house of peers, and on Aug. 21, 1658, the protector created him a viscount, which honor he refused. After the death of Cromwell he was made by his son Richard one of the commissioners of the great seal, and after the displacement of Richard he was named member of the council of state. As president of this body he repressed the insurrection of Sir George Booth, refused to aid Monk, and on the reassembling of the long parliament gave up the great seal. He wrote "Memorials of the English Affairs from the Beginning of the Reign of King Charles the First to the Happy Restoration of King Charles the Second" (1682; enlarged, 1732; new ed., 4 vols. 8vo, Oxford, 1853); "Journal of the Swedish Embassy in 1653 and 1654" (1772; new ed., 1855); and "Memorials of the English Affairs from the supposed Expedition of Brute to this Island to the End of the Reign of King James the First," published in 1709 by William Penn.

WHITE MOUNTAINS, a mountain chain of New England. According to the recent survey of the state of New Hampshire, the mountains are considered as belonging to the Atlantic system, an older series than the Appalachian, extending from Newfoundland to Alabama, east of the latter. In a wider sense it begins about the head waters of the Aroostook in Maine, its first great summit being Mt. Katahdin. The deep valley of the Chesuncook, Pemadumcook, and Millinoket lakes divides it; but beyond these rise on either side of the deep depression of Moosehead lake Spencer mountain and Bald mountain; thence its course is S. W. Dead river, one of the largest affluents of the Kennebec, forces a passage through it, and near the S. bank of that river it rises again in the important summit of Mt. Bigelow. It continues its S. W. course to the Androscoggin, sending a spur northward, along the E. bank of the Magalloway river, and along the shore of Lake Umbagog. After the passage through it of the Androscoggin, it spreads out S. of that river into a broad plateau, 1,600 to 1,800 ft. in height, 30 m. long from N. to S., and about 45 m. broad, extending nearly across New Hampshire, and bounded S. by the Merrimack river and Squam, Winnipiseogee, and Ossipee lakes. This plateau, from which rise more than 200 peaks, and which is traversed by several deep narrow valleys, forms the region known to tourists as the "White Mountains." The peaks cluster in two groups, the eastern or White mountain group proper and the Franconia group, separated from each other by a table land from 10 to 15 m. wide. The principal summits of the eastern group are, beginning at the Notch and passing around to Gorham, Mts. Webster, Jackson, Clinton, Pleasant, Franklin, Monroe, Washington, Clay, Jefferson, Adams, and Madison. Mt. Washington is the highest, and is indeed the highest mountain summit in New England, being 6,293 ft. above the sea, according to the most recent measurement, 8 ft. higher than earlier estimates. The height of some of the other peaks is as follows: Pleasant, 4,764 ft.; Franklin, 4,904; Monroe, 5,384; Jefferson, 5,714; Adams, 5,794; Madison, 5,365. The principal summits of the Franconia group are Mts. Lafayette (5,259 ft.), Liberty, Cherry mountain, and Moosilauke (4,811). Near the southern border of the plateau rise Whiteface mountain, Chocorua peak (3,540 ft.), Red hill, and Mt. Ossipee; and in the east Mt. Pequawket, 3,251 ft. North of the plateau, and near the upper waters of the Connecticut river, are several considerable summits, of which the twin mountains known as the Stratford peaks are the most considerable. The plateau is traversed and its surface deeply furrowed by several streams: the Androscoggin and its tributaries, which form the N. E. valley; the Saco and its branches, which form two deep depressions in the eastern group, and finally form a part of the S. E. boundary of the plateau; the Pemigewasset, the principal affluent of the Merrimack, which divides the Franconia group from N. to S.; and the Lower Ammonoosuck and Israel's rivers, tributaries of the Connecticut, which form valleys in the N. W. part of the plateau.—The geological formation of the White mountains is almost entirely of the ancient metamorphic rocks. In many of the peaks the upper portion is composed of huge masses of naked granite or gneiss; and the coarse gravelly soil which has been formed by the debris in the lower portion only supports those trees and shrubs which will grow in the hardest and poorest ground. The most noteworthy of many waterfalls among the mountains are: the Artist's fall in North Conway; the Silver cascade, on the side of Mt. Webster; Ripley's falls, on a tributary of the Saco, below the Willey house, the lower one, Sylvan Glade cataract, falling 156 ft. at an angle of 45°, in a stream from 50 to 75 ft. wide; the falls of the Ammonoosuck, which in a course of 30 m. descends over 5,000 ft.; the Berlin falls, on the Androscoggin, descending over 200 ft. in the course of a mile; and the Crystal cascade and Glen Ellis fall, near the Glen house, on a tributary of the Androscoggin. There are five "notches," or passages through the mountains: the White mountain notch, 1,914 ft. high, 2 m. long, and at its narrowest point only 22 ft. wide, through which the Saco river passes; the Franconia notch, 2,014 ft., which permits the passage of the Pemigewasset; the Pinkham notch, 2,018 ft., through which a branch of the Saco and one of the Androscoggin find their way; and the Grafton and Dixville notches, through which flow the Androscoggin and one of its tributaries. "The Flume" at Franconia notch is the most noted of the narrow waterways excavated through the rock, though there are others hardly inferior to it. Among the other objects of interest in the Franconia group is the "Old Man of the Mountain," on Profile mountain, opposite Mt. Lafayette; it is a well defined profile of the human face, 80 ft. long, formed by three projecting rocks. At the base of the mountain lies a beautiful lakelet a quarter of a mile long and an eighth wide, called "Profile lake," or the "Old Man's Washbowl." Five miles S. of the Franconia notch is the "Basin," a circular bowl-like cavity 45 ft. in diameter and 28 ft. in depth, produced by the whirling of large stones in a natural hollow in the rock by the current. It is filled with clear sparkling water, which flows down the mountains in a succession of beautiful clear cascades. The "Pool," in the same vicinity, is a natural well in the solid rock 60 ft. in diameter and 190 ft. deep, of which 40 ft. is water. A carriage road has been constructed to the summit of Mt. Washington, on the E. side, and a railroad on the W. side, the latter completed in 1869. A rough stone building, 40 by 22 ft. and 8 ft. high, with walls 4 ft. thick, was erected under the lee of the highest rocks on Mt. Washington in 1852, and a second structure, known as the "Tip-top house," not long after. In 1872 the new Summit house, 170 by 30 ft., 2½ stories high, was erected. There are now several additional buildings, including one occupied as a meteorological station by the United States signal service. The White mountain plateau is approached by travellers from four directions, viz.: from the east by the Grand Trunk railroad to Gorham, also direct to the Fabyan house by the Portland and Ogdensburg railroad from Portland, Me.; from the south by Lake Winnipiseogee and the valley of the Pemigewasset; from the southwest by way of the Connecticut river and the Boston, Concord, and Montreal railroad to the Fabyan house; and from the north by the Grand Trunk railroad to Northumberland.—The White mountains were first visited by white men in 1642. John Josslyn, a naturalist, visited them between 1663 and 1671, and gave an account of his journey in his "New England's Rarities discovered" (1672). No settlements were made in the region till about 1771. The first scientific exploration was made in 1784 by the Rev. Manasseh Cutler, D. D., of Ipswich, and six others. In 1797, and again in 1803, President Dwight passed through the White mountain notch, and he gives a full description of it in his "Travels." In July, 1804, Dr. Cutler again visited the mountains, and made observations to ascertain the height of Mt. Washington, and with some friends collected the alpine plants of the region. In 1816 Dr. J. Bigelow, Dr. Francis Boott, Mr. F. C. Gray, and Chief Justice Shaw made a thorough natural history survey of the mountains, which was published by Dr. Bigelow under the title of "Account of the White Mountains of New Hampshire." The flora of the mountains was also thoroughly explored by Mr. W. Oakes, of Ipswich, who published "Scenery of the White Mountains" (4to, with 16 plates, 1828). The most complete work illustrative of the scenery, botany, and history of the region is "The White Hills, their Legends, Landscapes, and Poetry," by the Rev. T. Starr King (4to, Boston, 1859). Since 1868 the mountains have been very thoroughly explored by the New Hampshire geological survey, under Prof. Charles H. Hitchcock, state geologist, whose reports describe fully their geology, mineralogy, botany, zoölogy, scenery, topography, and exploration (vol. i., 4to, Concord, 1875). This organization established a meteorological station on the summit of Mt. Washington in the winter of 1870–'71.

WHITE PINE, an E. county of Nevada, bordering on Utah; area, 6,720 sq. m.; pop. in 1870, 7,189, of whom 292 were Chinese; in 1875, 2,557, of whom 80 were Chinese. It consists of a high plateau crossed N. and S. by alternate hills and valleys. The mountains abound in minerals, and are covered with timber and grazing lands; the valleys are generally fertile. Of these the most noticeable is Spring valley, from 8 to 20 m. wide, and extending across the county. The principal wealth is in the silver mines, of which, according to the United States census, 11 were in operation in 1870, producing ore to the value of $1,375,386. Since then the yield has largely fallen off. The chief productions in 1870 were 1,750 bushels of barley, 23,875 of potatoes, 13,950 lbs. of wool, and 6,318 tons of hay. There were 966 horses, 575 milch cows, 1,516 other cattle, 5,650 sheep, and 224 swine; 14 quartz mills, 1 manufactory of iron castings, and 6 of pig lead. Capital, Hamilton.

WHITE PLAINS, a town and the county seat of Westchester co., New York, on the Harlem railroad, 25 m. N. N. E. of the city hall of New York; pop. in 1870, 2,630; in 1875, 2,727. It contains two banks, four schools, two weekly newspapers, and six churches.—On Oct. 12, 1776, Gen. Howe, for the purpose of flanking the American position on the upper part of Manhattan island, landed the van of his army on Throgg's neck, Westchester co. Washington immediately occupied the causeway and bridge leading from the neck, began the evacuation of Manhattan island, and detached a corps to White Plains. On the 18th the British, having resolved to strike at White Plains, crossed in boats, landing at the mouth of Hutchinson river, just below East Chester. The Americans proceeded up the W. bank of the Bronx river, and on the 23d Washington established his headquarters at White Plains. In the mean time several skirmishes had taken place. On the 25th Howe, who had been reënforced, encamped at Scarsdale, his right being about 4 m. from White Plains. On the morning of the 28th he advanced with 13,000 men, but, hesitating to attack Washington, who occupied a strong position with somewhat superior numbers, he sent about 4,000 men to carry Chatterton hill, W. of the Bronx, which was held by about 1,400 Americans under McDougall. This movement was successful, McDougall being forced to retire to Washington's camp with a loss of about 80 prisoners and nearly 100 killed and wounded; the British lost 229. Howe now waited for reënforcements to attack Washington, but on the night of the 31st the latter withdrew his army to a still stronger position on high ground above White Plains. On Nov. 5 Howe broke up his encampment and moved to Dobbs Ferry, and on the 9th Washington began sending part of his troops to New Jersey, following himself soon after. Lee with the residue remained some time longer E. of the Hudson.

WHITE RIVER. See ARKANSAS, vol. i., p. 714.

WHITE SEA (Russ. *Bieloye More*), a large gulf or branch of the Arctic ocean, which penetrates far into N. W. Russia, between lat. 63° 48′ and 68° 40′ N. It is nearly semicircular; length from N. E. to S. W. about 360 m., greatest breadth from N. W. to S. E. 280 m. At its entrance, between Kanin Nos and Sviatoi Nos, it is about 100 m. wide. It forms four large gulfs or bays, viz.: that of Mezen on the northeast, that of Archangel on the south, that of Onega on the southwest, and the deep inlet extending, with a mean width of 25 m., nearly 100 m. into Lapland on the northwest, called the gulf of Kandalask. Its area is estimated at 44,000 sq. m. It has numerous small islands, and two of considerable size, that of Solovetz, in the Solovetzkoi group, at the entrance of the gulf of Onega, and Morzhovetz, at the entrance of the bay of Mezen. The sea has bold and rocky shores, and deep waters, except in the gulf of Archangel. The Mezen, Dwina, Onega, Vyg, Kem, Kamienna, and many smaller streams flow into the White sea. Its only large port is Archangel at the mouth of the Dwina. The navigation is open for five or six months of the year. Fish are abundant. The white whale, or whitefish of the whalemen, seal, salmon, cod, herring, &c., are caught in large numbers; and from Archangel and the other towns on the coast vessels are sent to Spitzbergen, Nova Zembla, and the continental coasts of the Polar sea in pursuit of whales, seals, and walruses.—The White sea first became known to English navigators through Richard Chancellor, commanding a ship in the unfortunate squadron of Sir Hugh Willoughby in 1553, who landed on the shores of the gulf of Archangel.

WHITESIDES, a N. W. county of Illinois, separated from Iowa by the Mississippi river and intersected by Rock river; area, 730 sq. m.; pop. in 1870, 27,503. The surface is level and diversified by prairies and woodland, and the soil is very fertile. It is intersected by the Chicago and Northwestern and the Rockford, Rock Island, and St. Louis railroads. The chief productions in 1870 were 457,719 bushels of wheat, 31,658 of rye, 2,162,943 of Indian corn, 880,838 of oats, 89,078 of barley, 219,476 of potatoes, 732,591 lbs. of butter, 63,381 of cheese, 40,660 of wool, and 54,833 tons of hay. There were 14,944 horses, 13,129 milch cows, 22,143 other cattle, 11,168 sheep, and 37,765 swine; 2 manufactories of agricultural implements, 21 of carriages and wagons, 10 of furniture, 2 of gloves and mittens, 1 of wrapping paper, 1 of woollens, 11 flour mills, 1 distillery, 2 breweries, 2 planing mills, and 6 saw mills. Capital, Morrison.

WHITE SULPHUR SPRINGS, a post village of Greenbrier co., West Virginia, on Howard's creek, and on the Chesapeake and Ohio railroad, by which it is 227 m. W. of Richmond. It is a place of summer resort on account of its mineral spring, which yields about 30 gallons per minute, and has a temperature of about 62° F. The first use of the waters by the whites is said to have been in 1778. Buildings have been erected capable of receiving 1,500 guests. At distances by the roads from about 20 to 40 m. from this spring are the Red, Salt, and Blue Sulphur springs, at each of which there are accommodations for guests.

WHITE SWELLING, the popular name for a chronic inflammation of the joints occurring in scrofulous subjects. The complaint appears sometimes to originate in a slight injury; sometimes no cause can be assigned for its occurrence. The joint slowly becomes stiff and swollen; for a long time it is painful only on being moved. The swelling is caused largely by the parts exterior to the joint becoming thickened and infiltrated with plastic and fatty matters. It comes on very slowly, and as it supervenes the prominences of the bones are lost, and the joint becomes rounded and has a doughy or semi-elastic feel. The appearance of the skin, which for a long time preserves its natural color, gives the disease its popular name. The swelling, considerable in itself, seems greater from the wasting of the rest of the limb. The disease has a great tendency to run on to suppuration, which takes place both within and around the joint. This is rapidly followed by hectic fever, and often by the development of tubercles in the lungs. The general treatment consists in hygienic measures, a generous diet, and the use of iron, cod-liver oil, phosphoric acid, and iodine. Locally, the chief indication is to keep the joint in a state of perfect rest, and this is best done by the use of splints or the starch bandage. When the inflammation has entirely subsided, friction and stimulating liniments may be employed.

WHITEWEED. See DAISY.

WHITEWOOD. See TULIP TREE.

WHITFIELD, a N. W. county of Georgia, bordering on Tennessee and bounded E. by the Conasauga river; area, 286 sq. m.; pop. in 1870, 10,117, of whom 1,511 were colored. The county is mountainous, but contains fertile valleys. It is traversed by the Selma, Rome, and Dalton, the Western and Atlantic, and the East Tennessee, Virginia, and Georgia railroads. The chief productions in 1870 were 48,860 bushels of wheat, 135,007 of Indian corn, 33,120 of oats, 3,851 of Irish and 10,563 of sweet potatoes, 7,211 lbs. of wool, 97,510 of butter, and 763 tons of hay. There were 974 horses, 1,569 milch cows, 2,446 other cattle, 4,350 sheep, and 7,439 swine; 5 flour mills, 6 tanneries, 6 currying establishments, and 4 saw mills. Capital, Dalton.

WHITFIELD, George. See WHITEFIELD.

WHITGIFT, John, an English prelate, born in Great Grimsby, Lincolnshire, in 1530, died at Lambeth, Feb. 29, 1604. He was educated at Pembroke hall, Cambridge, under Ridley. After the accession of Elizabeth he entered into holy orders (1560), and was made chaplain to Cox, bishop of Ely; subsequently he became Lady Margaret's professor of divinity, and in 1567 master of Pembroke hall. Soon after the queen made him her chaplain and master of Trinity college, Cambridge, and the same year he also became regius professor of divinity. In 1571 he was vice chancellor of the university, and in 1572 prolocutor to the lower house of convocation. About this time, at the desire of Archbishop Parker, he wrote an answer to a work entitled "An Admonition to the Parliament," which had bitterly assailed the established church. His reply was attacked by Cartwright, and Whitgift rejoined in his "Defence." He was now made dean of Lincoln, and in 1576 bishop of Worcester, and, having also received a civil commission as vice president of the marches of Wales, made constant use of both the temporal and spiritual powers to put down Roman Catholicism and Puritanism. In 1583 he became archbishop of Canterbury. Making use of the court of high commission created under the act of supremacy passed at the beginning of Elizabeth's reign, he removed from stations in the church all schismatics or nonconformists. In 1585 the star chamber, of which he was a member, at his instigation passed ordinances for the regulation of the press, by which no one was allowed to print except in London, Oxford, and Cambridge; and none but a few special printers were to be suffered to print anything whatsoever until it should be perused and allowed by the archbishop of Canterbury and the bishop of London. In 1586 he was sworn of the privy council, and framed the statutes of cathedral churches; and in 1595 he assisted in drawing up the celebrated Lambeth articles.—His life was written by Strype and by Sir George Paule. See also Hook's "Lives of the Archbishops of Canterbury," vol. x. (London, 1875).

WHITING. See HAKE.

WHITING, William, an American lawyer, born in Concord, Mass., March 3, 1813, died in Boston, June 29, 1873. He graduated at Harvard college in 1833, and at the Cambridge law school in 1838, and practised in Boston. From 1863 to 1865 he was solicitor of the war department at Washington. He was elected to congress in 1872, but died before taking his seat. He published "The War Powers of the President and the Legislative Powers of Congress, in relation to Rebellion, Treason, and Slavery" (Boston, 1862; 10th ed., with additions, 1863).

WHITLEY. I. A S. E. county of Kentucky, bordering on Tennessee, and intersected by the Cumberland river; area, about 450 sq. m.; pop. in 1870, 8,278, of whom 138 were colored. The surface is hilly and broken. Iron ore and bituminous coal are abundant. The falls of the Cumberland river are in this county. The chief productions in 1870 were 6,913 bushels of wheat, 251,872 of Indian corn, 34,587 of oats, 20,544 of Irish and 10,348 of sweet potatoes, 128,219 lbs. of butter, 20,827 of wool, and 18,866 of tobacco. There were 1,804 horses, 2,802 milch cows, 5,100 other cattle, 10,507 sheep, and 15,816 swine. Capital, Whitley Court House. **II.** A N. E. county of Indiana, intersected by Eel river; area, 324 sq. m.; pop. in 1870, 14,399. The surface is undulating, but there are several prairies; the soil is very fertile. The Pittsburgh, Fort Wayne, and Chicago railroad passes through it. The chief productions in 1870 were 290,506 bushels of wheat, 192,813 of Indian corn, 88,595 of oats, 42,454 of potatoes, 257,517 lbs. of butter, 63,266 of wool, and 12,199 tons of hay. There were 5,064 horses, 5,403 milch cows, 6,332 other cattle, 21,263 sheep, and 12,397 swine; 10 manufactories of carriages and wagons, 2 breweries, 1 woollen mill, and 32 saw mills. Capital, Columbia City.

WHITLOW, or Felon (*paronychia*), an abscess occurring on the fingers, attended with great pain and inflammation, commencing in, if not confined to, the terminal joint. The cutaneous or superficial whitlow consists of an inflammation of the skin of the last phalanx, with burning pain and effusion of a serous or bloody fluid, raising the cuticle into a blister; when it is under the skin, and especially when about the nails, there is great pain and throbbing until the pus, which is almost sure to form, is let out, attended often with loss of the nails. In the tendinous form or thecal abscess, where the inflammation is within the sheaths of the tendons, the pain is much more severe, and the pus, from inability to escape through the fibrous tissues, burrows upward along the sheaths into the palm of the hand, and even to the forearm and arm, producing severe constitutional symptoms and irritative fever, sometimes requiring amputation to save life. The treatment consists in the continued application of poultices in the early stages of the affection, with opiates if necessary, and, above all, deep and free incisions as soon as there is reason to believe that the formation of pus is taking place. In the severer forms, the finger is often rendered permanently stiff, owing to adhesions between its tendon and the neighboring parts.

WHITMAN, a S. E. county of Washington territory, bounded E. by Idaho, S. by Snake river, and W. by the Columbia; area, about 3,000 sq. m. It has been formed since 1870 from the S. portion of Stevens co., and is intersected by the Palouse river. Capital, Colfax.

WHITMAN, Sarah Helen (POWER), an American poetess, born in Providence, R. I., in 1803. She married in 1828 John Winslow Whitman, a lawyer of Boston, since whose death in 1833 she has resided in Providence. She has published "Hours of Life, and other Poems" (1853); "Edgar Poe and his Critics" (1860); and with her sister, Anna Marsh Power, two fairy ballads, "Cinderella" and "The Sleeping Beauty" (revised ed., 1867–'8).

WHITMAN, Walt, an American poet, born at West Hills, Suffolk co., L. I., May 31, 1819. He was educated in the public schools of Brooklyn and New York, learned the printer's trade, worked at it in summer, and taught school in winter. In 1847–'8 he made an extended tour through the United States and Canada, following for long distances the courses of the great western rivers. For brief periods he edited papers in New Orleans and in Huntington, L. I., and then learned the carpenter's trade in Brooklyn. In 1855 he published "Leaves of Grass," a volume of rhapsodical poems, without rhyme and often without rhythm, which has been increased in each of five successive issues. From 1862 to 1865 he was a volunteer nurse in the military hospitals in Washington and in Virginia. From 1865 to 1874 he held a government clerkship at Washington. In 1873 he was disabled by paralysis. His miscellaneous writings, including his diary of camp and hospital experience, are collected in a volume entitled "Two Rivulets." In 1876 he published new editions of this and of "Leaves of Grass." He now (1876) resides at Camden, N. J. He has never married.

WHITNEY, Eli, an American inventor, born in Westborough, Mass., Dec. 8, 1765, died in New Haven, Conn., Jan. 8, 1825. He graduated at Yale college in 1792, went to Georgia, and studied law in Savannah while residing in the house of the widow of Gen. Greene. At this time a pound of green-seed cotton was all that a negro woman could clean in a day, and Whitney, at the instance of Mrs. Greene, undertook to devise a machine to do the work. He was compelled to draw his iron wire, and to manufacture his own tools. Mrs. Greene and Mr. Miller, who afterward became Whitney's partner, were the only persons permitted to see the machine; but rumors of it had gone through the state, and before it was quite finished the building was broken open by night, and the machine carried off. Before Whitney could complete his model and obtain his patent, several machines based on his invention had been made, and were in operation. Mr. Miller formed a partnership with him in May, 1793, and Whitney went to Connecticut to manufacture the machines, but the patent was continually infringed upon. The South Carolina legislature granted him $50,000 for his invention, which was finally paid after vexatious delays and lawsuits. North Carolina allowed a percentage for the use of each saw for five years, and collected and paid it over to the patentees in good faith; and Tennessee promised to do the same thing, but afterward rescinded her contract. For years, amid accumulated misfortunes, lawsuits, the burning of his factory, the report that his machine injured the fibre of the cotton, the refusal of congress through the opposition of southern members to allow the patent to be renewed, and the death of his partner, Whitney struggled on until, convinced that he should never receive a just compensation for his invention, he turned his attention to the manufacture of firearms for the government, from which he reaped a fortune. He was the first who made each single portion of the gun adapted to any one of the thousands of arms in process of manufacture at the same time. His factory was at Whitneyville, Conn. The application of several of his inventions to other manufactures of iron and steel added to his reputation, though but little to his wealth. (See COTTON, vol. v., p. 406.)

WHITNEY, Josiah Dwight, an American geologist, born in Northampton, Mass., Nov. 23, 1819. He graduated at Yale college in 1839, and studied in Europe between 1842 and 1846. He was engaged in the geological survey of New Hampshire in 1840; of the Lake Superior mineral region, with J. W. Foster, in 1847–'50; of Iowa (and the lead region of Wisconsin) in 1855–'60; and he was head of the California survey from 1860 to 1874, when it was abandoned. On the results of the three surveys last mentioned he has published reports. Since 1865 he has been professor of practical geology in Harvard university. He has also published "Use of the Blowpipe," &c., translated from Berzelius (Boston, 1845); "Metallic Wealth of the United States" (Philadelphia, 1854); the "Yosemite Guide Book" (San Francisco, 1869); and many papers in American and foreign journals.

WHITNEY, William Dwight, an American philologist, brother of the preceding, born in Northampton, Mass., Feb. 9, 1827. He graduated at Williams college in 1845, and studied at Berlin and Tübingen from 1850 to 1853. At Berlin he transcribed from the manuscripts in the royal library the text of the *Atharva-Veda*, which he collated with manuscripts of the poem in Paris and England, and published in connection with Prof. Roth (8vo, Berlin, 1856); a second volume, containing translation, notes, &c., is in preparation (1876). In 1854 he was appointed professor of Sanskrit and comparative philology in Yale college, which chair he still occupies (1876). Since 1857 he has been corresponding secretary of the American oriental society, and one of the principal editors of its "Journal," to which and to other periodicals, both English and German, he has contributed many papers on oriental and philological subjects. Among his more important contributions to the "Journal" are his translation, with notes, of the *Sûrya-Siddhânta*, a text book of Hindoo astronomy, and his editions of the *Atharva-Veda Prâtiçâkhya* and the *Taittirîya Prâtiçâkhya*, with commentaries, the last of which received the Bopp prize in 1870 from the Berlin academy; and his reviews of Lepsius's phonetic alphabet, and of the views of Biot, Weber, and Müller on the Hindoo and Chinese asterisms. Prof. Whitney gave assistance in the preparation of the last edition of Webster's dictionary (1864), and was one of the contributors to the Sanskrit dictionary published at St. Petersburg. He aided in founding the American philological association in 1869, and was its first president. He has also published "Language and the Study of Language" (New York, 1867; German translation, Munich, 1874); "A Compendious German Grammar" and "Reader" (2 vols., 1869); "Oriental and Linguistic Studies" (2 series, 1872–'4); and "Life and Growth of Language" (1875; French translation, Paris, 1875; German translation, Leipsic, 1876).

WHITSUNTIDE. See PENTECOST.

WHITTEMORE, Amos, an American inventor, born in Cambridge, Mass., April 19, 1759, died in West Cambridge, March 27, 1828. He worked for some years as a gunsmith, but finally, in partnership with his brother and several others, began to manufacture cotton and wool cards. He soon invented a machine for puncturing the leather and setting the wires, which was patented in the United States in 1797, and Whittemore went to England to secure his rights there, but was unsuccessful. In the United States the patent was sold for $150,000; but afterward his brother Samuel Whittemore repurchased it, and carried on the business. (See CARDS.)

WHITTEMORE, Thomas, an American clergyman, born in Boston, Jan. 1, 1800, died in Cambridge, Mass., March 21, 1861. He was apprenticed successively to several trades, and finally studied theology. In April, 1821, he was settled as a Universalist minister at Milford, Mass., and in 1822 he removed to a church in Cambridgeport. He resigned this pastorate in 1831, but resided in Cambridge for the remainder of his life. Early in his ministry he was joint editor of the "Universalist Magazine," and in 1828 he established the "Trumpet," a Universalist newspaper in Boston, of which he was sole editor and proprietor for nearly 30 years. He was also president of the Cambridge bank and of the Vermont and Massachusetts railroad. In 1830 he published "A History of Universalism" (enlarged ed., vol. i., 1860). His other works are: "Notes and Illustrations of the Parables" (Boston, 1832); "Songs of Zion" (1836); "Plain Guide to Universalism" (1839); "The Gospel Harmonist" (1841); "Conference Hymns" (1842); "Sunday School Choir" (1844); "Life of Rev. Hosea Ballou" (4 vols. 12mo, 1854–'5); "Autobiography" (1859); and commentaries on Daniel and Revelation.

WHITTIER, John Greenleaf, an American poet, born in Haverhill, Mass., Dec. 17, 1807. His parents belonged to the society of Friends, of which he is also a member. He worked on the farm till his 20th year, attended Haverhill academy two years, and in 1829 became editor of the "American Manufacturer" in Boston, and in 1830 of the "New England Weekly Review" at Hartford. But he soon returned to the farm, and in 1835–'6 was a member of the Massachusetts legislature. In 1836 he was appointed secretary of the American anti-slavery society, and removed to Philadelphia, where in 1838–'9 he edited the "Pennsylvania Freeman," the office of which was sacked and burned by a mob. From this time he was one of the most prominent anti-slavery men in the country, and his writings, both prose and poetry, were largely in support of that cause. In 1840 he removed to Amesbury, Mass., where he still resides (1876), and in 1847 became corresponding editor of the "National Era," an anti-slavery newspaper published in Washington. He has never married. His prose publications are: "Legends of New England," partly in verse (Hartford, 1831); "Justice and Expediency, or Slavery Considered with a View to its Abolition" (1833); "The Stranger in Lowell" (1845); "Supernaturalism in New England" (1847); "Leaves from Margaret Smith's Journal" (1849); "Old Portraits and Modern Sketches" (1850); and "Literary Recreations" (1854). His poetical works include "Mogg Megone" (Boston, 1836); "Ballads" (1838); "Lays of my Home, and other Poems" (1843); "The Bridal of Pennacook" (1848); "The Voices of Freedom" (Philadelphia, 1849); "Songs of Labor, and other Poems" (Boston, 1850); "The Chapel of the Hermits, and other Poems" (1853); "The Panorama, and other Poems" (1856); "Home Ballads and Poems" (1860); "In War Time, and other Poems" (1863); "Snow-Bound" (1866); "The Tent on the Beach, and other Poems" (1867); "Among the Hills, and other Poems" (1868); "Miriam, and other Poems" (1870); "The Pennsylvania Pilgrim, and other Poems" (1872); "Mabel Martin" (1874); and "Hazel Blossoms" (1875). Several collective editions have been published. As a poet Whittier is more peculiarly American than any other of equal fame. His poems have been largely inspired by current events, and their patriotic, democratic, and humane spirit gives a strong hold upon the public. He wrote a hymn for the opening of the centennial exhibition at Philadelphia in 1876.

WHITTINGHAM, William Rollinson, an American bishop, born in New York, Dec. 2, 1805. He graduated at the General theological seminary in 1825, was ordained March 11, 1827, and became rector of St. Luke's church, New York, in 1831. In 1835 he became professor of ecclesiastical history in the General theological seminary, and in 1840 bishop of Maryland. He has edited the "Family Visitor" and "Children's Magazine," monthly, and the "Churchman," weekly; also, the "Parish Library of Standard Works," with introductions and notes (13 vols. 12mo, 1828 *et seq.*); Jahn's "Introduction to the Old Testament," in conjunction with Dr. Turner (1827); Palmer's "Treatise on the Church of Christ" (2 vols. 8vo, 1841); "Commonitory of Vincent of Lérins," new translation, with notes, &c. (1847); and "Ratramn on the Lord's Supper," with a revised translation (1848).

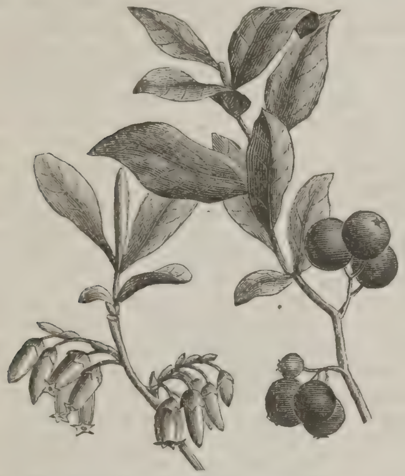
WHITTREDGE, W. See supplement.

WHITWORTH, Sir **Joseph,** an English mechanician, born in Stockport in 1803. He founded the manufacturing firm of Joseph Whitworth and co. in Manchester, and made many inventions and improvements, first becoming generally known by his planing and tool machines exhibited in 1851. He was a commissioner to the international exhibition at New York in 1853. In 1854 he began to manufacture rifles with a hexagonal bore and elongated grooved projectile, and has since applied the same principle to breech-loading cannon. (See ARTILLERY, and CANNON.) He was made a baronet in 1869, and in the same year founded the "Whitworth scholarships" for the encouragement of mechanical and engineering science. They are 30 in number, of £100 a year each, tenable for two or three years. He has published "Miscellaneous Papers on Mechanical Subjects" (1858), and "Papers on Practical Subjects: Guns and Steel" (1873).

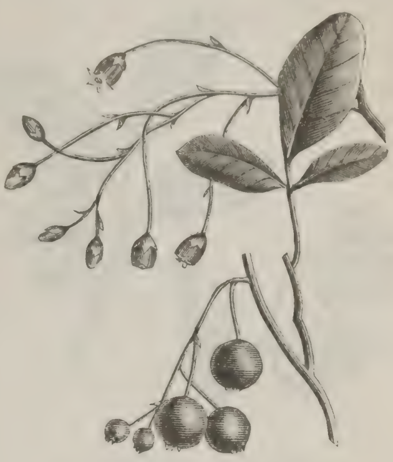
WHOOPING COUGH, an affection characterized by paroxysms of convulsive cough, accompanied by short and sudden acts of noisy expiration, followed by a long and whooping inspiration; it is the chincough of the English, the *pertussis* of Sydenham, and the *coqueluche* of the French. It generally occurs but once in the life of an individual, and most frequently during infancy or childhood. It does not appear to have been distinguished from catarrhal affections until about the 18th century, and it is almost exclusively confined to temperate and cold regions. It begins with the symptoms of ordinary catarrh, which continue five or ten days, after which the convulsive character of the cough becomes manifest, at intervals of from half an hour to four hours; the paroxysm is attended with the signs of threatened suffocation, lividity and swelling of the face and neck, fulness of the eyes, quick pulse, and extreme agitation; at the end of a few minutes the coughing ceases on the vomiting of food or tough mucus; in severe cases there may be discharges of blood from the nose and mouth, and even fits of faintness. When the whoop is established, the catarrhal symptoms diminish or disappear, the fever is very slight, and the child may be lively, with good appetite, and apparently well in the intervals of the paroxysms; after three or four weeks, in the most favorable cases, the cough becomes looser and milder, with longer intervals, and finally ceases in two or three months, though recovery may be much delayed by unpleasant weather or exposure to cold.—Simple whooping cough runs its limited time, not amenable to medical treatment, and is rarely if ever fatal; but its complications of pulmonary and cerebral disease may destroy life, or leave various marks of irritation and inflammation in the lungs and brain, while the simple disease leaves no trace which throws light upon its nature. It may occur at all seasons, sometimes epidemically, and is unquestionably often communicated by infection. The whoop and the paroxysmal character of the cough prevent this disease from being confounded with any other. In simple cases the prognosis is favorable, but its complications in teething, unhealthy, or recently weaned children are dangerous and frequently fatal. In uncomplicated whooping cough the treatment consists, in the first stage, of that proper for ordinary catarrh, with gentle laxatives and emetics, low diet, simple expectorants, and confinement in a well ventilated, moderately warm room; careful watch must be kept for pulmonary inflammation, which must be met at once by appropriate remedies. When the second or paroxysmal stage has been fairly established, with diminution of fever, return of appetite, and an approach to health during the intervals, a change of air from the city to the country, and *vice versa,* with antispasmodics and expectorants, will complete the cure.

WHORTLEBERRY, Hurtleberry, or **Huckleberry,** the name of plants and their fruit of the genera *Gaylussacia* and *vaccinium,* constituting a suborder of the *ericaceæ* or heath family. The form huckleberry is now generally used by American botanists and in trade. Formerly all the whortleberries were included in *vaccinium;* but as several differ essentially in the structure of the fruit, they were separated under *Gaylussacia.* Both genera are shrubs with scaly buds; the calyx adherent to the ovary, upon the top of which is the monopetalous tubular, bell-shaped, or variously formed corolla, including the eight to ten stamens; the fruit a usually edible berry, crowned with the short calyx teeth. In *Gaylussacia* the leaves of most species have resinous dots; the anthers open by a chink at the blunt or tapering top, and are awnless; the fruit is a compound drupe rather than a proper berry, and contains ten small, seed-like, one-seeded stones. In *vaccinium,* the leaves are without resinous dots; the cells of the anthers taper upward into a tube, which has a hole at the top for the escape of the pollen, and sometimes each cell bears an awn-like appendage on the back;

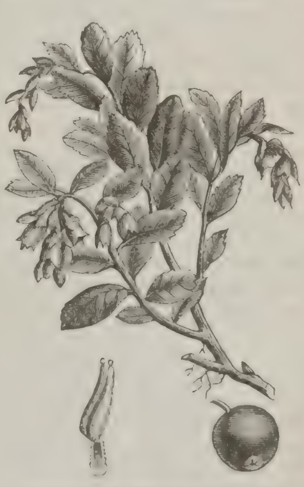
the four to five cells of the fruit are sometimes divided into eight or ten cells by the growth of a partition as the fruit matures, but in either case are many-seeded. In both genera are species with evergreen and with deciduous leaves. There are about 30 species of *Gaylussacia* in South America, and about five in the United States. The most important species is *G. resinosa*, so named on account of the resinous globules which are very conspicuous to the touch, and they are also abundant on the young leaves, rendering them viscid on the calyx and corolla; it is a much-branched shrub, 1 to 3 ft. high, with oval or oblong leaves; flowers in short, one-sided racemes, the corolla at first five-angled, conical and contracted at the mouth, at length cylindrical and open, reddish, tinged with yellowish green; the fruit globular and shining black, with a pleasant, slightly acid flavor. This is common except in the southwest, and is everywhere known as the black huckleberry, but dealers often distinguish the berries as crackers; they bear transportation better than any other, on account of their greater firmness. A variety occasionally occurs with the berries nearly white, or with a pink tinge. The dwarf whortleberry (*G. dumosa*), about as tall as the preceding, is found in sandy soil near the coast from Maine to Florida; its leaves are hairy when young, but thick and shining when old; the long racemes of white flowers with conspicuous bracts, the ovary bristly, corolla bell-shaped; fruit black and insipid. The dangleberry (*G. frondosa*), also called blue-tangle, is 3 to 6 ft. high, with spreading branches; its large, late fruit is by many regarded as superior to all others.—The genus *vaccinium* (an ancient name of obscure derivation) contains about 100 species, natives of temperate and subtropical Europe, Asia, and America, and is subdivided into several well marked subgenera. (See Bilberry, and Cranberry.) The species known here and in England as cowberry is *V. vitis Idæa*, a prostrate evergreen, with small, dark green, obovate leaves, bell-shaped pink flowers with four or five spreading lobes, and red, acid, bitterish, and somewhat astringent berries, much esteemed in northern Europe for preserving; it is found in northern New England, especially on the mountains. In New England the fruit of the vacciniums are generally called blueberries, though some of this genus have black fruit, when they are called huckleberries; the distinction, seldom made elsewhere, being founded on the color of the fruit, rather than on the plant producing it. The earliest fruit is afforded by the dwarf blueberry (*V. Pennsylvanicum*), a prostrate shrub rarely over a foot high, which in the northernmost states covers large tracts, bearing in July a profusion of large blue berries, with a dense



Black Whortleberry (Gaylussacia resinosa).



Dangleberry (Gaylussacia frondosa).



Cowberry (Vaccinium Vitis Idæa).

bloom, very sweet, and so tender as hardly to bear transportation. The low or pale blueberry (*V. vacillans*) is erect, with pale leaves and branches, and bears a fruit similar to the preceding. The swamp blueberry or huckleberry (*V. corymbosum*) is one of the most common and variable species, and is found over a large portion of the country; it is from 5 to 10 ft. high, and often forms large clumps; its large white flowers are conspicuous; the fruit ripens the latest of all, and is either blue with a bloom or shining black, there being several marked varieties, which formerly ranked as species.—The picking of whortleberries for market is in some localities an important industry, and the business is as well systematized as that of marketing cultivated fruits. Whortleberries grow in such abundance spontaneously that no attempts have been made to improve them by cultivation. Several species are found only on the high mountains or along our northern border, which with others, including some evergreens, found only in the southern states, and often in restricted localities, being of no economical or commercial importance, need not be enumerated.

Swamp Huckleberry (Vaccinium corymbosum).

WHYDAH BIRD. See Weaver Bird.

WHYMPER, Edward, an English traveller, born in London, April 27, 1840. He early became known by his ascent of Mt. Pelvoux, one of the highest of the French Alps, and in 1861 he scaled the "chimney" of the Matterhorn. He attempted to reach the summit in 1863 and 1864, and accomplished the ascent July 14–15, 1865; three of his companions, Lord F. Douglas, the Rev. Charles Hudson, and W. Hadow, and a guide, perished in descending. In 1867 and 1872 he made adventurous expeditions to Greenland, collecting curious specimens. He has published "Scrambles amongst the Alps, 1860–'69, including the first Ascent of the Matterhorn and the Attempts which preceded it," illustrated by himself (London, 1871).—His relative, Frederick Whymper, has published "Travel and Adventure in the Territory of Alaska" (1868), and "The Heroes of the Arctic and their Adventures" (1875).

WICHERN, Johann Heinrich, a German philanthropist, born in Hamburg, April 21, 1808. He studied theology at Göttingen and Berlin. In 1833 he founded at Horn, near Hamburg, a reformatory for vagrant children, called *Rauhes Haus*, and opened it with 12 inmates. At present the institution has several hundred inmates and 20 buildings. Among its departments or separate institutions are that for redeeming neglected children, grouped together in families of 12, occupied in agricultural and other labors, and educated in classes of 24; that of "brothers," or assistants engaged as teachers and superintendents, selected from respectable mechanics and other avocations, whom a probation of three years qualifies for "inner missions" in Germany and foreign countries, and as officers of prisons; and the publishing department, agency, and bookbinding establishment. The inner missions, originally formed among the pietists of the Evangelical church, were organized in 1843, and Wichern became the leader. In 1848 a central committee was organized at his suggestion, which sends missionaries all over the world. The *Rauhes Haus* became the principal institution of the mission, and since 1844 has appeared a monthly periodical, *Fliegende Blätter des Rauhen Hauses*, founded and edited by Wichern. The annual expenses for each child are estimated at $50. The reform of the whole system of prisons and reformatories in Germany and other countries was due to his influence, and his *Rauhes Haus* became the model of the colony of Mettray and of other agricultural colonies and kindred institutions. In 1858 he was placed at the head of all the Prussian penal and correctional institutions, with the title of chief consistorial councillor in connection with the ministry of religion. He has published *Die Innere Mission der deutsch-evangelischen Kirche* (Hamburg, 1849; 2d ed., 1850), *Festbüchlein des Rauhen Hauses* (3 vols., 1856), *Unsere Lieder* (4th ed., 1870), &c.

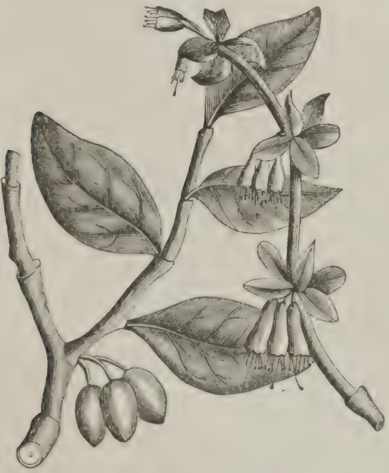
WICHITA. **I.** An unorganized N. W. county of Texas, bounded N. by Red river and drained by the Wichita and other streams; area, 655 sq. m.; returned as having no population in 1870. It has a diversified surface, and is partly covered by dense forests. **II.** An unorganized W. county of Kansas; area, 720 sq. m. It is watered by affluents of the Arkansas and Smoky Hill rivers, and has a level or slightly rolling surface.

WICKLIFFE. See Wycliffe.

WICKLOW. **I.** A S. E. county of Ireland, in the province of Leinster, bordering on Dublin, St. George's channel, Wexford, Carlow, and Kildare; area, 782 sq. m.; pop. in 1871, 78,509. The coast is generally rocky and precipitous. The chief rivers are the Slaney, Vartrey, and

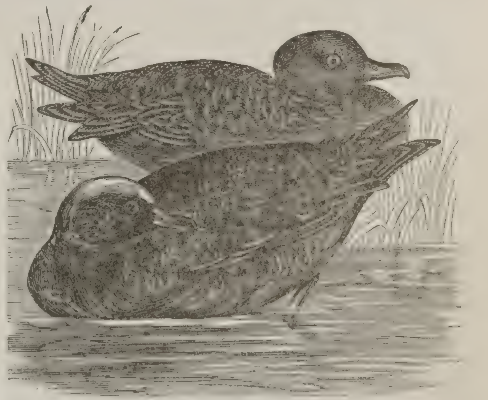
Ovoca or Avoca. The county is mountainous, Lugnaquilla, the highest peak, being 3,039 ft. above the sea. Gold and silver are found in small quantities, and also iron, lead, zinc, copper, tin, manganese, arsenic, antimony, and pyrites. The soil is moderately productive. The principal towns, besides the capital, are Bray and Arklow. **II.** A seaport, capital of the county, on the right bank of the estuary of the river Vartrey, 22 m. S. S. E. of Dublin; pop. in 1871, 3,164. Vessels drawing 8 or 9 ft. enter the harbor, and the town exports grain, and copper and lead ores.

WICOMICO, a S. E. county of Maryland, bounded N. by Delaware, E. by the Pocomoke river, and W. by the Nanticoke, and intersected by the Wicomico, a tributary of Chesapeake bay, navigable to Salisbury, about 25 m.; area, about 350 sq. m.; pop. in 1870, 15,802, of whom 4,406 were colored. The surface is generally low and level, and the soil moderately productive. It is traversed by the Eastern Shore and the Wicomico and Pocomoke railroads. The chief productions in 1870 were 12,103 bushels of wheat, 405,627 of Indian corn, 17,693 of oats, 31,214 of Irish and 29,127 of sweet potatoes, 48,308 lbs. of butter, and 14,333 of wool. There were 1,521 horses, 5,526 cattle, 5,766 sheep, and 8,822 swine; 2 planing mills, 17 saw mills, and 3 ship yards. Capital, Salisbury.


Wicopy (Dirca palustris).

WICOPY, a popular name for *Dirca palustris*, a shrub of the mezereum family (*thymelaceæ*), peculiar to North America, growing in woods from New England to Georgia. *Dirca* (Gr. *Δίρκη*, a fountain near Thebes, applied to this by Linnæus), of which there is but one species, is a much-branched shrub; its branches, starting from near the base, give it a rounded form; it is commonly from 2 to 6 ft. high, sometimes reaching 12 ft.; each joint or internode enlarges upward, giving the branches a striking appearance; the bark, which is yellowish gray, is very tough, while the wood is tender and brittle; the bast cells of the inner bark are among the longest known in woody tissue; they are from $\frac{1}{8}$ to $\frac{1}{6}$ in. long, while those of the wood are $\frac{1}{100}$ in. The deciduous, alternate leaves are oval or obovate, 2 to 3 in. long, downy at first, but at length smooth, pale green, the bases of their short petioles concealing the buds of the next year. The apetalous flowers are in clusters of three or four, and precede the leaves, which soon appear from the same hairy bud; the petal-like calyx is pale yellow, about $\frac{1}{2}$ in. long, with an irregularly toothed border; stamens eight, protruded, the alternate ones longer; the one-celled, one-ovuled ovary becoming a berry-like, oval, one-seeded, reddish drupe. The plant blooms so profusely in April that it is often cultivated as an ornamental shrub. The most remarkable thing about it is the great toughness of its bark, on account of which it is useful for thongs, and is sometimes woven into baskets. Leatherwood and moosewood are other common names, but the latter properly belongs to a species of maple. The bark produces vomiting when administered internally, and the berries, like those of the related daphne, are said to be poisonous.

WIDGEON, the common name of the river ducks of the genus *mareca* (Steph.). They have a bill shorter than the head, of equal width throughout, much rounded at the tip, with a strong broad nail, and upper lamellæ prominent; wings long and pointed, first and second quills longest; tail moderate and wedge-shaped; toes fully webbed, and hind one lobed. There are about 10 species in various parts of the world, performing periodical migrations at night in vast flocks; they are found on the sea shore and on the margin of lakes and rivers, feeding chiefly on vegetable substances. The American widgeon or bald-pate (*M. Americana*, Steph.) is about 22 in. long and 35 in. in alar extent; the tail has 14 feathers, and the bill is blue, black at the base and tip; upper


European Widgeon (Mareca Penelope).

parts finely waved transversely with black and gray or reddish brown, and lower parts mostly white; top of head nearly white, with a broad green patch around and behind the eyes; rest of head and neck grayish, spotted and banded with black; wing coverts white, the greater tipped with black; speculum green, encircled by black; tertials black on the outer web, edged with white. It has a swift and well sustained flight, and is found in company with teals and other ducks; it is distributed throughout North America, and is accidental in Europe. The flesh is highly esteemed, especially when they have fed in the rice fields; they breed in the north, and also in Texas, according to Audubon, and the eggs are six to eight. The European widgeon (*M. Penelope*, Bonap.) is rather smaller, and not uncommon all along the Atlantic coast of the United States; it differs chiefly in having the head and neck reddish brown or cinnamon, the former with a few dusky spots, the top of the head cream-colored, and a few traces of green around the eyes.

WIDIN, or **Widdin,** a fortified town of Turkey, in W. Bulgaria, on the Danube, 370 m. N. W. of Constantinople, and 130 m. S. E. of Belgrade; pop. about 25,000. It is situated on a wide plain formed by a bend of the river opposite Kalafat in Little Wallachia, and is of great strategic importance. A Greek archbishop resides here. The town has a trade in grain, wine, and salt. The ships from the Black sea anchor in fair weather close to it. —In 1689 the Turks were signally defeated here by the imperialists, but the fortress itself, though frequently assailed, has never been captured, and is hence called the "Virgin Fort." The fortifications were strengthened in 1853–'4, when the environs on both banks of the Danube were for a time the principal theatre of the war. Turkish troops were concentrated here in March, 1876, as a protection against Servia. Near by is the town of Bonu, which is generally identified with the site of ancient Bononia, in upper Mœsia.

WIDOW BIRD. See WEAVER BIRD.

WIED, Prince of. See NEUWIED.

WIELAND, Christoph Martin, a German author, born at Oberholzheim, Swabia, Sept. 5, 1733, died in Weimar, Jan. 20, 1813. Soon after his birth his father settled as Protestant minister at Biberach. He displayed a precocious talent for poetry, and acquired an extensive knowledge of ancient and modern literature at his father's house and at the school of Klosterbergen, near Magdeburg. After spending about a year and a half at Erfurt, he went home in 1750. Marie Sophie Guterman von Gutershofen, his cousin, then visiting his father, won his love, and ever after remained his friend, and for a time his literary guide, although in 1760 she married the councillor Laroche, under which name she became known in literature. After spending some time at the university of Tübingen, he accepted in 1752 Bodmer's hospitality at Zürich, assisting him in literary work. Subsequently he was a private teacher in that city, and for a short period in Bern, where he composed his tragedy *Clementina von Porretta*, after Richardson's "Sir Charles Grandison." At Biberach, where in 1760 he became chief of the local administration, he translated 22 of Shakespeare's plays (8vo, Zürich, 1762–'6), which paved the way for far superior translations. A visit of Sophie Laroche and her husband to Count Stadion, in the vicinity of Biberach, brought Wieland into contact with persons of rank, and the count's extensive library improved his knowledge. In 1765 he contracted a happy marriage with an Augsburg lady, who bore him 14 children, and died in 1801. In 1769 he was appointed professor of philosophy at Erfurt; but the academical authorities had little regard for fanciful writers, and especially objected to his amatory poems, in defence of which he wrote *Der verklagte Amor* and *Nachlass des Diogenes von Sinope* (1770). At the same time he satirized Rousseau in his humorous novel *Koxhox und Kikequetzel* (1769–'70), and wrote *Beiträge zur geheimen Geschichte des menschlichen Verstandes und Herzens aus den Archiven der Natur* (1770). The duchess Amalia of Saxe-Weimar-Eisenach engaged him in 1772 as teacher for her sons, the future grand duke Charles Augustus and his brother, and gave him the title of councillor and a salary, subsequently continued as a pension, of 1,000 thalers. At this time there was a general outcry against him as a licentious and atheistical writer. Lavater called upon all good Christians to pray for the sinner; and in 1773, on Klopstock's birthday, Wieland's works were burned by the disciples of that poet. But gradually he became better appreciated. He founded at Weimar the *Deutscher Merkur*, a monthly periodical, which he edited for many years, and in which his explanatory notes relating to his lyric drama *Alceste* and his general treatment of mythological heroes resulted in a controversy with Goethe and Herder, and in the former's *Götter, Helden und Wieland.* Goethe, after his arrival in 1775 at Weimar, became a friend of Wieland, who had replied to his adverse criticism with characteristic placidity. He resided at his country seat of Osmannstedt near Weimar from 1797 to 1803, when he removed to that city and became intimate with Schiller. To the last he remained a favorite of the court and literary circles. He was buried in the garden of his country house by the side of his wife and of Sophie Brentano, the granddaughter of Sophie Laroche. Soon after his death Goethe delivered a memorial address before the *Amalia-Loge*, of which Wieland had been a life-long member. A bronze statue of him by Gasser was placed on the Wielandsplatz at Weimar in 1857, shortly before the erection of Rietschel's double statue of Goethe and Schiller.—Wieland's epics were the forerunners of the romantic school; his style and influence imparted a high degree of grace and elegance to German poetry, and made it more attractive to the cultivated classes. At the same time he greatly promoted classical culture by his translations of Horace's epistles and satires, and his commentaries upon them, and by his versions of Aristophanes and his complete translation of Lucian, which served as a basis for Tooke's in English. He also composed many German imitations after Lucian, edited the *Attisches Museum* (1796–1804) and the *Neues Attisches Museum* (jointly with others, 1805–'9), and at the time of his death had translated and annotated a large portion of Cicero's letters (5 vols., 1808–'12). His most celebrated work is the romantic poem *Oberon* (1780; new annotated edition by Köhler, 1868; English translation by W. Sotheby, London, 1826). His other works comprise the didactic poems *Musarion* (1768) and *Die Grazien* (1770); the comic poem *Der neue Amadis* (1771); the novels *Geschichte des Agathon* (1766–'7) and *Aristipp und einige seiner Zeitgenossen* (1800–'1); the picture of an ideal state in *Der goldene Spiegel, oder die Könige von Scheschian* (1772); and the humorous *Geschichte der Abderiten* (1774; English translation, "The Republic of Fools, being the History of the State and People of Abdera in Thrace," by H. Christmas, 2 vols., London, 1861). After his death were published selections from his correspondence (4 vols., Zürich, 1815, and 2 vols., Vienna, 1815), and his *Briefe an Sophie La Roche* (Berlin, 1820). Wieland revised his complete works (42 vols., Leipsic, 1794–1802; new eds., 50 vols., 1818–'28, 36 vols., 1839–'40, and 36 vols., Stuttgart, 1851–'6). His life has been written by Gruber (4 vols., Leipsic, 1827) and Löbell (Brunswick, 1858).

WIELICZKA. See SALT.

WIENIAWSKI, Henri, a Polish violinist, born in Lublin, July 10, 1835. His mother was a sister of the composer Eduard Wolff, who carried him at the age of eight to Paris. He was admitted as a pupil at the conservatory in November, 1843, there receiving instruction on the violin from Clavel and Massart, obtained the first prize in 1848, and then took up the study of harmony under Colet. He appeared in concerts at 17, and has since made a reputation in both hemispheres as one of the first of living violinists. He came to the United States with Rubinstein in 1872. He has composed much for the violin, and is now (1876) a professor at the conservatory in Brussels.

WIERTZ, Antoine Joseph, a Belgian painter, born in Dinant, Feb. 22, 1806, died in Brussels, June 18, 1865. He was born of poor parents, and received no early instruction, but when only four years old he sketched with rapidity; at the age of 10 he painted a portrait, and at 12 engraved on wood and printed his own pictures. He went to Antwerp in 1820, and, after working for several years in poverty, finished his studies at the academy of Antwerp, under Matthew van Brée, and took the grand prize for painting. In 1834 he went to Rome as a pensioner of the Antwerp academy, and in 1835 sent to Antwerp his "Greeks and Trojans contending for the Body of Patroclus," painted on a canvas 20 by 30 ft. This picture was sent to the Paris academy for exhibition, and was refused admission, whereupon Wiertz forged his own name on a veritable Rubens and sent that to Paris. This also was refused, when the artist revenged himself by writing *La critique en matière d'art, est-elle possible?* In 1840 his *Éloge de Rubens* received the medal offered by the Antwerp academy for the best essay on Rubens. Convinced that trade was death to art, he resolved never to sell any of his pictures, and only occasionally did he paint a portrait to procure means of subsistence. His "Patroclus" was quickly followed by "The Brigand," "The Carnival of Rome," "The Revolt of Hell against Heaven," "The Education of the Virgin," and "The Triumph of Christ." The last picture, which was on a canvas 50 by 30 ft., was received with so much favor that the government built for him a large studio in Brussels, after designs made by him from one of the ruined temples at Pæstum, on condition that he would leave his pictures to the state. Since his death this has constituted the Wiertz museum, in which all his works are exhibited. Wiertz established himself in it in 1848, and afterward painted some of his most characteristic pictures, dealing largely in the grotesque and the horrible. Among these are "Thoughts and Visions of a Head cut off," "A Second after Death," "Precipitate Inhumation," "A Scene in Hell," "The Child Burned," "Hunger, Folly, and Crime," and "The Birth of the Passions." He painted also "Christ at the Tomb," "The Man of the Future regarding the Things of the Past," and "The Last Cannon," representing the triumph of civilization over war. Many of these pictures are painted in a style invented by him and named *peinture mate*, combining the qualities of fresco and oil colors. In 1865 a commission appointed by the Belgian government to investigate its merits reported adversely. An essay by Wiertz entitled *L'école flamande de peinture*, was crowned by the royal academy of Belgium in 1863. He bequeathed his pictures to the nation, but did not leave money enough to pay his funeral expenses.

WIESBADEN, a city of Prussia, in the province of Hesse-Nassau, formerly the capital of the duchy of Nassau, in the basin of the Salza, on the S. E. slope of the Taunus mountains, 20 m. W. by S. of Frankfort; pop. in 1871, 35,463, all Protestants excepting 7,000 Catholics and about 1,000 Jews. It is one of the great German watering places, and in 1875 was visited by 40,000 tourists and invalids. The Wilhelmsstrasse, half a mile long, lined with trees, leads from the railway station to the Theaterplatz, with a beautiful theatre, opposite the Kursaal. The latter is a magnificent building on the E. side of a square, the

N. and S. sides of which have covered colonnades with stores. It is the centre of attraction, and has ball, reading, dining, and concert rooms, a splendid parlor surrounded by marble pillars, extensive pleasure grounds, and an arcade of iron and glass (the *Trinkhalle*), which connects the grounds with the Kochbrunnen. This is the principal boiling spring (about 156° F.), yielding 17 cub. ft. of water per minute. The next hottest and largest spring is the Adlerbrunnen in the Adler hotel (about 144° F.), and there are many other springs used for drinking and bathing. There are also water-cure, orthopedic, gymnastic, and other establishments, and about 30 bathing houses with over 800 separate rooms. The heat in summer is oppressive; the season extends to autumn, when the weather is delightful. The vicinity of the Rhine and of Frankfort and Homburg makes it a favorite resort for excursionists, especially on Sundays; on week days it has a monotonous and hospital-like appearance. Wiesbaden has a splendid Protestant church, built in 1853, a Catholic church with three large naves and fine altarpieces, finished in 1849; a royal (formerly ducal) and other palaces, the art union gallery, a library of 70,000 volumes, and a museum of antiquities and natural history; and in the vicinity are Fresenius's chemical laboratory, an agricultural institute, and a Greek chapel with gilded cupolas. The once excessive rouge-et-noir and faro gambling was restricted in 1862, and altogether abolished in 1872.—Like many other places containing thermal springs, Wiesbaden was a Roman military station. Under the Carlovingians a royal residence existed here under the name of Wisibad, and Otho I. raised the place to the rank of a town. Remains of a Roman castle were found in 1838, and of baths and a temple in 1867-'8.—The district of Wiesbaden (pop. about 600,000) includes most of the former duchy of Nassau, the landgraviate of Homburg, and the territory of Frankfort.

WIESELBURG (Hung. *Mosony*), a W. county of Hungary, bordering on Pressburg, Raab, Oedenburg, and Lower Austria; area, 751 sq. m.; pop. in 1870, 75,486, chiefly Germans. It is watered by the Danube, the Leitha, and the Rabnitz. With the exception of a small tract in the east, the county is very fertile. The chief product is wheat. Capital, Ungarisch-Altenburg (Hung. *Magyar-Óvár*).

WIFE. See HUSBAND AND WIFE, and MARRIAGE.

WIG (a contraction of periwig, Fr. *perruque*), a covering for the head formed of hair, silk, thread, or other material designed to imitate the natural hair. The oldest wigs in existence, among the Egyptian antiquities of the British and Berlin museums, are composed of hair. Astyages, king of the Medes, according to Xenophon, wore a wig. Allusions to wigs are found in the writings of Livy, Ovid, Martial, Juvenal, Propertius, Plutarch, and Suetonius; and even the use of natural hair in their manufacture was understood by the ancient Romans, the blond locks of the German maidens being preferred. In the early ages of the Christian era, the fathers of the church vainly protested against the use of wigs; and afterward even churchmen themselves covered their heads with perukes. Henry III. of France, having lost his hair from sickness, wore a wig, and his courtiers began to follow his example. Under Louis XIII. the use of wigs became general; they were made of silk or thread. The dimension of the wig increased from the beginning of the reign of Louis XIV., and at length it extended half way down the back, while the curls on the sides fell equally low upon the breast. The wigs were generally made of silk, though a few of the most costly were of hair. From France the fashion pervaded Europe, and it was at its height in England during the reign of Queen Anne. Toward the close of his life Louis XIV. began to powder the wig slightly; Louis XV. made it completely white, and his courtiers followed the fashion. This practice continued till the French revolution, when wigs and powder disappeared together from France. The large, white, "full-bottomed" wig is still worn by the English judges. The large wig was somewhat in vogue in the American colonies in the last half of the 18th century, but disappeared after the revolution.

WIGAN, a parliamentary and municipal borough of Lancashire, England, on the Douglas river near its head, on the Leeds and Liverpool canal, and on the Northwestern railway, 16 m. W. N. W. of Manchester; pop. in 1871, 39,160. It has a Latin school, a mechanics' institute, a library, and a museum. In 1872 there were 27 places of worship. The cotton mills employ more than 10,000 persons; and there are also manufactories of woollen goods, edge tools, nails, brass ware, machinery, and agricultural implements. The town is ancient; the older part stands on the right and the modern (called Scholes) on the left bank of the river, which is crossed by several bridges. It stands in an extensive coal field.

WIGHT, Isle of, an island in the English channel, 2 m. off the coast of Hampshire, to which county it is politically attached, separated from the mainland by the roadstead of Spithead and the Solent; extreme length 23 m., breadth 14 m.; area, about 160 sq. m.; pop. in 1871, 66,165. Newport is the chief town, and the other places of importance are Cowes, Ryde, Ventnor, a watering place, and St. Helen's. The coast is indented by several small estuaries and bays, and at the S. part and "back of the island" it is bold and cliffy. The principal streams are the Brading, Medina, and Yar. The general surface is elevated, and consists of plains or downs, diversified with hills and dales and tracts of woodland. The scenery is picturesque and romantic, some points attaining an altitude of about 800 ft. The elevated part of the island consists of chalky formations, particularly rich in fossil remains, under which are various kinds of schists. Good coal, yellow and red ochre, fullers' earth, sandstone, pipe clay, native alum, sulphur, and copperas stones are found. Sand and flints for the manufacture of glass and china are extensively exported. The climate is remarkably healthful, and so mild that myrtles, geraniums, and many other delicate plants grow luxuriantly in the open air. The soil is generally a rich loam, and a very small portion of the surface is waste. Wheat, oats, barley, turnips, and potatoes are the principal crops. Large flocks of sheep of superior quality are fed upon the uplands. Some manufactures are carried on at Newport. The principal exports are grain, wool, salt, and silicious sand. The Isle of Wight contains very extensive barracks, erected from 1800 to 1815. Osborne house, the marine villa of Queen Victoria, is near East Cowes on the N. shore of the island. Carisbrooke castle is near Newport. (See CARISBROOKE.)

WIGHT, Peter Bonnett, an American achitect, born in New York, Aug. 1, 1838. He studied under Thomas R. Jackson, and in 1862 was appointed architect of the new building for the national academy of design. The intention in this structure was to unite sculpture, mosaic, painting, and architecture in one conception; and Mr. Wight encouraged the workmen, under his teaching, to make their own designs for the decorations wrought by themselves. Among his other works are the Yale school of fine arts at New Haven, the building of the mercantile library association in Brooklyn, and various buildings in Chicago, where he now resides (1876).

WIGHTMAN, William May, an American clergyman, born in Charleston, S. C., in 1808. He graduated at the college of Charleston in 1827, and in 1828 was admitted into the South Carolina conference of the Methodist Episcopal church. In 1837 he became professor of English literature in Randolph Macon college, Va., but resigned at the close of the next year. He was editor of the Charleston "Southern Christian Advocate" from 1840 to 1854, when he became president of Wofford college. In 1859 he was elected chancellor of the Southern university, at Greensboro, Ala. In 1866 he was elected bishop of the M. E. church, South. He published in 1858 a life of Bishop Capers.

WIGTONSHIRE, or Wigtownshire, a county of Scotland, bordering on Ayrshire, Kirkcudbrightshire, the Irish sea, and the North channel; area, 512 sq. m.; pop. in 1871, 38,830. The coast is generally bold and rocky, and indented by several bays, the most important of which are those of Wigton, Luce, and Loch Ryan. The principal rivers are the Cree and Badenoch, which are navigable for short distances. The surface is generally hilly, but the elevation above the sea nowhere exceeds 1,500 ft., and in general varies between 400 and 900 ft. About one third of the land is arable, but it is generally better suited for grazing than tillage. The principal crops are oats, barley, wheat, and potatoes. Great attention is paid to rearing cattle. Wigton or Wigtown, the capital (pop. about 2,000), is a municipal and parliamentary burgh, near the mouth of the Badenoch in Wigton bay, 15 m. W. by N. of Kirkcudbright. The other chief towns are Stranraer and Whithorn.

WILBERFORCE. I. William, an English philanthropist, born in Hull, Aug. 24, 1759, died in London, July 29, 1833. He was educated at Cambridge, and elected to parliament in 1780, and held a seat there till 1825. In the session of 1786 he proposed a plan for purifying county elections by establishing a registry of freeholders and holding the poll in several places at once. This measure was incorporated in the reform bill of 1832. Early in 1787 he aided in establishing a society for the reformation of manners. Thomas Clarkson entreated him to exert himself in favor of the abolition of the slave trade, and soon after the meeting of parliament in 1787 he gave notice of his purpose to call the attention of the house to the subject; but in consequence of ill health and other hindrances, it was not till 1791 that he moved for leave to bring in a bill to prevent further importation of African negroes into the British colonies. He continued to press it till 1807, when he secured its adoption in both houses. He next agitated the question of negro emancipation, and continued it till his retirement. Just before his death the emancipation act was passed. He published "A Practical View of the prevailing Religious System of Professed Christians in the Higher and Middle Classes of this Country, contrasted with real Christianity" (1797; translated into French, Italian, Spanish, Dutch, and German), many essays and pamphlets, and a volume of "Family Prayers." His income was largely devoted to charity. He was buried in Westminster abbey, and a statue was erected there to his memory.—His sons published his life (5 vols., 1838; new ed., 1868) and a selection from his letters (2 vols., 1840). See also "William Wilberforce: his Friends and his Times," by John C. Colquhoun (London, 1866). **II. Robert Isaac,** an English clergyman, second son of the preceding, born at Broomfield house, near Clapham common, Dec. 19, 1802, died in Albano, Italy, Feb. 4, 1857. He graduated at Oxford in 1823, was chosen fellow of Oriel college, and became tutor and public examiner *in litteris humanioribus*. In 1830 he took charge of a parish, and in 1840 obtained the living of Burton Agnes, and was made archdeacon of the East Riding of Yorkshire. His publications include "The Five Empires, an Outline of Ancient History" (1840; 10th ed., 1856); "Rutilius and Lucius, or Stories of the Third Age" (1842); "Doctrine of the Incarnation" (1848); "Doctrine of Holy Baptism" (2d ed., 1849); "History of Erastianism"

(1851); "Doctrine of the Eucharist" (1853); "Inquiry into the Principles of Church Authority" (1854); and sermons "On the Holy Communion" and "On the New Birth of Man's Nature." In 1854 he resigned his preferments, was received into the Roman Catholic church in Paris, and entered the ecclesiastical academy at Rome, with the design of becoming a priest. **III. Samuel,** an English bishop, brother of the preceding, born at Broomfield house, Sept. 7, 1805, killed by a fall from his horse near Dorking, July 19, 1873. He was educated at Oxford, was ordained in 1828, and appointed rector of Brightstone in the Isle of Wight in 1830. In 1837 and 1845 he was select preacher before the university of Oxford; in 1839 became archdeacon of Surrey, rector of Alverstoke, and chaplain to Prince Albert; in 1840 canon of Winchester cathedral; in 1841 Bampton lecturer; in 1844 sub-almoner to the queen; and in 1845 dean of Westminster. In November, 1845, he was made bishop of Oxford, and in 1869 transferred to the see of Winchester. In 1847 he was made lord high almoner of the queen. He was one of the ablest debaters in the house of lords. His principal works are: "Eucharistica" (1839); "Rocky Island and other Parables" (1840); "Agathos and other Stories" (1840); "History of the Protestant Episcopal Church in America" (1844); "Times of Secession Times of Revival" (1863); and several volumes of sermons. A massive granite cross has been erected on the spot where he was killed.

WILBRORD, or Willibrod, Saint, generally called the apostle of the Frisians, born in the Saxon kingdom of Northumbria about 657, died in the monastery of Echternach, near Treves, Nov. 7, 738. He was brought up in St. Wilfred's monastery at Ripon, and spent 13 years in Ireland, where he had as masters the monks Egbert and Wigbert, who had spent two years preaching the gospel in Friesland. At the age of 33, with 11 or 12 associates, he embarked as a missionary to that country. Wilbrord twice visited Rome, in 692 and 695, and was made bishop by Sergius I. over all the converted Frisians.

WILCOX. I. A S. central county of Georgia, bounded N. E. by the Ocmulgee river; area, 500 sq. m.; pop. in 1870, 2,439, of whom 537 were colored. The surface is undulating and the soil fertile. The chief productions in 1870 were 47,130 bushels of Indian corn, 11,870 of oats, 15,866 of sweet potatoes, 17,839 lbs. of wool, and 700 bales of cotton. There were 447 horses, 1,627 milch cows, 3,672 other cattle, 8,998 sheep, and 7,431 swine. Capital, Abbeville. **II.** A S. W. county of Alabama, intersected by the Alabama river; area, about 900 sq. m.; pop. in 1870, 28,377, of whom 21,610 were colored. The surface is undulating and the soil generally fertile. The Selma and Gulf railroad crosses the E. part. The chief productions in 1870 were 660,978 bushels of Indian corn, 91,463 of sweet potatoes, 47,428 lbs. of butter, and 20,095 bales of cotton. There were 1,702 horses, 3,418 mules and asses, 4,722 milch cows, 7,350 other cattle, 2,897 sheep, and 17,020 swine. Capital, Camden.

WILD CAT. See Cat, vol. iv., p. 92, and Lynx, vol. x., p. 754.

WILDE, Richard Henry, an American author, born in Dublin, Ireland, Sept. 24, 1789, died in New Orleans, Sept. 10, 1847. He was admitted to the Georgia bar in 1809, became attorney general of the state, and in 1815 was elected to congress, where he had a seat also in 1824-'5 and 1827-'35. In 1835 he went to Italy, where he began a biography of Dante, and completed one volume in manuscript. He published "Conjectures and Researches concerning the Love, Madness, and Imprisonment of Torquato Tasso" (2 vols. 12mo, New York, 1842), which contains a number of original translations of the poems of Tasso. In 1844 he was appointed professor of common law in the university of Louisiana. His son has edited his "Hesperia," a poem (Boston, 1867).

WILDEBEEST. See Gnu.

WILDERNESS, Battles of the, a series of engagements in the American civil war, May 5-26, 1864, between the federal army of the Potomac under Gen. Grant and the confederate army of northern Virginia under Gen. R. E. Lee. The Wilderness is a wild tract along the S. bank of the Rapidan, in Orange and Spottsylvania counties, Va.; its length from E. to W. is about 15 m., and its breadth about 10 m. It is a plateau sloping to cultivated lowlands on every side. Its forests were long since cut away, to furnish fuel for the iron furnaces in the neighborhood; and a dense growth of scrub oak, dwarf pines, and brambles now covers nearly the whole area, with here and there a patch of woods or a small clearing. It is crossed from E. to W. by two good roads, about 2 m. apart, the Orange turnpike to the north and the Orange plank road to the south. Two or three tolerable roads cross it from N. to S. On the E. border of this tract was fought the battle of Chancellorsville, May 2-4, 1863, and on its W. border that of Mine Run, at the end of November, 1863. During the winter of 1863-'4 the confederate army had occupied a strong position on the S. side of the Rapidan, its left (Longstreet) at Gordonsville, its centre (A. P. Hill) at Orange Court House, and its right (Ewell) on the river. Its effective strength at the opening of the campaign was about 60,000. The army of the Potomac, under the immediate command of Gen. Meade, consisted of three infantry corps (the 2d under Hancock, the 5th under Warren, and the 6th under Sedgwick) and Sheridan's cavalry. The 9th corps, under Burnside, joined it for this campaign, making Grant's total force about 130,000 men of all arms, of whom somewhat more than 100,000 were available for battle. It was Grant's plan to cross the river by the lower fords, pass through the Wilderness, turning Lee's right, and push S. W. toward Gordonsville, thus placing his whole army between Lee and Richmond. The army of the Potomac started at midnight of May 3, in two columns. Warren's and Sedgwick's corps, covered by Wilson's division of Sheridan's cavalry, forming the right column, crossed at Germanna ford, and Hancock's, the left, at Ely's ford, 6 m. below, covered by the rest of the cavalry corps under Sheridan in person. Burnside was left in position along the Orange and Alexandria railroad, one day's march in the rear, in anticipation of a possible movement by Lee toward Washington. Lee had caused a careful survey of the Wilderness to be made just after the battle of Chancellorsville, and was furnished with minute and accurate maps, while the federal commanders had none but old and imperfect ones. As soon as Lee discovered Grant's movement, he launched forward his whole army, by the turnpike and plank roads, to strike the Union column in the flank while on the march. This brilliant movement failed for a variety of reasons, but mainly because of the superior numbers of the Union forces, and the fact that the character of the battle field, an almost impenetrable wilderness, rendered manœuvring impossible. Warren, on the 5th, marching by a wood road and followed by Sedgwick, took the precaution of sending Griffin's division a short distance up the turnpike (W.), and Crawford's division up the plank road in the direction of Parker's store, then held by a detachment of Wilson's cavalry. Griffin was struck by Ewell in the morning, and Crawford by Hill a little later. The march was suspended, Crawford was withdrawn, and Griffin was reënforced by Wadsworth's division, with Robinson's in support. These forces quickly defeated Ewell's van, but the latter was continually reënforced, and the federals were in turn defeated. By 11 o'clock Grant became convinced that the enemy was present in force, and ordered Sedgwick to hurry up to the support of Warren, while Hancock, who had passed Tod's tavern and was then nearly 10 m. away, on the road to the left, marched back by the Brock road, to join Warren at its junction with the plank road. Getty's division of Sedgwick's corps was posted at this junction, with orders to hold it at whatever cost until Hancock should arrive. Across the turnpike, where the action had begun in the morning, the fighting was continuous and bloody till 4 o'clock in the afternoon, with no decisive advantage on either side, when both fell back a little and threw up fortifications only about 200 yards apart. Getty was sorely pressed by Hill, but held his ground till 3 o'clock, when Hancock's advance reached him. He then took the offensive, and continuous fighting was kept up till dark, with no decisive result, but heavy losses on both sides. Meanwhile Wadsworth had pushed southward to strike Hill's left flank, but did not arrive till night. In the night Grant brought up Burnside's corps, and posted it between Hancock and Warren; Lee brought up Longstreet's corps to the support of Hill, and also one division of Hill which had been left in the rear. Thus each side was strengthened by about 20,000 men. Both commanders resolved to attack on the morning of the 6th; Grant fixed upon 5 o'clock as the hour, but Lee anticipated him by a few minutes, throwing Ewell against the federal right. The assault was handsomely repulsed, and did not even delay the attack which Grant had ordered. Hancock promptly advanced against the front of the confederate right, while Wadsworth assailed its flank, and Hill was driven back a mile and a half, overrunning Lee's headquarters, and stopped only by Longstreet's advancing column. Hancock was expecting Longstreet to advance upon his left flank and rear from the Catharpen road, and up to 6 o'clock the latter was actually making such a movement; but at that hour Lee recalled him because of the heavy pressure in front. For this reason, Hancock had attacked with only half of his corps, holding the other half ready to repel any movement against it. Longstreet's advance having been checked, he resumed his flank movement, but at this moment he was seriously wounded and carried from the field, his command devolving upon R. H. Anderson. In the afternoon Lee threw the whole of Hill's and Longstreet's corps against Hancock, who had constructed breastworks and been reënforced; but no serious impression was made upon his line till 4 o'clock, when a fire that had sprung up in the woods was communicated to the brush and pine logs of the breastworks; the wind blowing in the faces of the federals, the heat and smoke quickly drove them out of their intrenchments. The confederates dashed forward and penetrated the lines, but were almost immediately repulsed, and Lee was forced to abandon what he had intended for the decisive assault. This virtually closed the battle, though after dark Lee threw Ewell's corps forward against the 6th corps. After some sharp fighting and much confusion, Ewell captured the larger part of two brigades and then fell back. The fighting in the Wilderness was almost exclusively with musketry, as the nature of the ground rendered artillery useless. It was a drawn battle, but Grant had secured the roads by which he was to pass out of the Wilderness to the south, had repulsed all of Lee's attacks, and was enabled promptly to resume the march toward Richmond.—After dark on the 7th Grant put his army in motion toward Spottsylvania Court House, 15 m. S. E. Warren and Sedgwick took the direct route, by the Brock road; Hancock and Burnside, with the trains, a route which made a detour to the east; but the marching was slow and spiritless. Warren's advance was obstructed by felled trees and by cavalry engagements in front, and by some infantry fighting in the woods on his flanks. Lee had anticipated Grant's movement, and was pushing on, by a parallel road, toward the same point. His advance, under Anderson, finding no good camping ground, continued the march all night, and thus reached Spottsylvania and had time to intrench before Warren came up. By the evening of the 8th Lee's whole force was in position, with improvised breastworks, on a ridge around Spottsylvania Court House, facing N. and E. The 9th was spent by Grant in making dispositions for attack, and by Lee in strengthening his position. In the afternoon Gen. Sedgwick was killed by a sharpshooter, and his command devolved upon Gen. Wright. On the 10th Hancock attacked the confederate left with considerable success, crossing to the S. side of the river Po; but Meade suddenly ordered him to recross and furnish troops for an intended assault on the centre. He was attacked in turn while withdrawing, and at the same time the woods between his force and the river took fire; he lost heavily, and many of his wounded perished in the flames, but the remarkable coolness and discipline of his men enabled him to inflict an almost equal loss upon the enemy. The main attack of the day was against Lee's left centre, in front of Warren, where a wooded hill, surrounded by a dense growth of low cedars and crowned with earthworks, formed perhaps the strongest point of the whole confederate line. The 2d and 5th corps attempted it, and were repulsed; at 5 o'clock P. M., with two of Hancock's divisions, they renewed the assault, and failed again, though some of the men entered the enemy's breastworks; still another attack resulted in still another bloody repulse. These assaults cost the federals over 5,000 men, while they inflicted scarcely one tenth of that loss upon the enemy. Further to the left, however, a portion of the 6th corps carried the first line of the confederate intrenchments and captured 900 prisoners. Lee's right centre formed a sharp salient. In the night of the 11th Hancock moved to a position within 1,200 yards of this, and at half past 4 o'clock in the morning of the 12th he stormed it. His heavy column overran the confederate pickets without firing a shot, burst through the abatis, and after a short hand-to-hand conflict inside the intrenchments captured 4,000 prisoners and pursued the enemy through the woods toward Spottsylvania Court House. When they came upon a second line of works, Hancock's men, having lost their organization, were forced to retire to the first line, which by the aid of the 6th corps they were enabled to hold. In the course of the day Lee made five determined attempts to retake this line, but each time he was heavily repulsed. The fighting at this point was as fierce as any during the war; frequently the rival colors were planted on opposite sides of the breastworks, the entire forest within musket range was killed, and in one case a tree 18 in. in diameter was cut clean in two by the bullets. While this was going on, Burnside on the left and Warren on the right made attacks, supposing that Lee must have weakened his wings, but were repulsed with considerable loss. At midnight Lee drew back to his interior line. For several days Grant continued to develop his left flank, but still found Lee's right unassailable. He then, in the night of the 20th, withdrew Hancock's corps from his right and sent it eastward, behind the cover of the remainder of the army, to Massaponax church, whence on the 21st it moved southward to Milford station on the Fredericksburg and Richmond railroad. This movement was repeated with the other corps, each in turn being taken from the right and passed to the left. At the same time Lee, by a precisely similar operation, moved in the same direction on a generally parallel route, but by a straighter road; and when on the 23d the national army arrived at the N. bank of the North Anna, its adversary was found posted on the S. bank. Hancock on the left, after some fighting, forced the passage of the river. Warren on the right, 4 m. higher up, crossed without opposition, but had only begun to intrench when he was furiously assailed in front and flank. The assault was repulsed at all points, and Warren took nearly 1,000 prisoners, losing about 350 in killed and wounded. The 6th corps crossed, and took position on Warren's right. Burnside, holding the centre of the line, attempted to throw his troops also across the river, and establish connection between Hancock and Warren, but was driven back. Thus Lee's centre, bending to the north, clung to the river at a point where it bends to the south, and neither of Grant's wings could reënforce the other without a double passage of the stream. In the night of the 26th the federal army was silently retired to the N. side of the river, and then marched by a wide circuit E. and S. to the Pamunkey, which it crossed. Again Lee had made a similar movement by a shorter line, and the next serious conflict was at Cold Harbor. (See CHICKAHOMINY, vol. iv., p. 416.) The losses of the army of the Potomac in these engagements were as follows:

DAYS.	Killed.	Wounded.	Missing.	Total.
May 5–12	3,288	19,278	6,844	29,41[illegible]
May 12–21	2,146	7,956	279	10,381
May 21–31	150	1,130	827	1,607
Total	5,584	28,364	7,450	41,398

This does not include the losses in Burnside's corps, which was not under Meade. No trustworthy statement of the confederate losses was made; they were probably about 20,000.

WILEY, Isaac William, an American clergyman, born in Lewistown, Pa., March 29, 1825. At the age of 18 he was licensed as a preacher of the Methodist Episcopal church, but on account of an injury of his voice he studied medicine, and graduated in the university of the city of New York in 1849. After practising his profession one year in Pennsylvania, he joined the Philadelphia conference, and was sent as medical missionary of the mission at Foochow, China. He returned to the United States in 1854, and was transferred to the Newark conference. In 1858 he was appointed president of the Pennington seminary and collegiate institute, New Jersey. He was editor of the "Ladies' Repository," Cincinnati, from 1864 to 1872, when he was elected bishop of the Methodist Episcopal church. He has published "The Fallen Missionaries of Fuh-chau" (New York, 1858).

WILFRED, or **Wilfrid, Saint,** bishop of York, born about 634, died in the monastery of Oundle, Oct. 12, 709. In order to bring the Scottish church into accord with the rest of Christendom as to the time of celebrating Easter, he visited Rome in 654. In 664 he took a prominent part in the famous conference at Whitby, where he obtained from Alchfred, king of Northumbria, a decision in favor of the Roman usage. The king also nominated him bishop of York. In order to obtain orthodox consecration he went to Gaul, and was consecrated by the bishop of Paris. During his absence his opponents put Ceadda into his place, and he did not gain possession until 667. King Egfred, the successor of Alchfred, was hostile to Wilfred, and in 677 divided his bishopric into three. Wilfred appealed to Rome and obtained a decision in his favor; but Egfred imprisoned and then exiled him. On the death of Egfred he was restored to his original see. The quarrel between Wilfred and the Scottish party continued; a synod in 692 again divided the bishopric of York, and although his rights were again confirmed by a papal decree, he was not reinstated.

WILHELM, Karl, a German musician, born in Smalcald, Sept. 5, 1828, died there, Aug. 26, 1873. He excelled in songs and pieces for the piano, and for 25 years taught music at Crefeld. He composed the music of *Die Wacht am Rhein* (1854), which became a national song, and for which the government granted him a pension of 1,000 thalers; and a monument to him has been erected at Smalcald.

WILHELMJ, August. See supplement.

WILHELMSHAVEN, a seaport town of Germany, in the former territory and at the N. W. end of the bay of Jade, since 1873 part of the Prussian province of Hanover, 40 m. N. W. of Bremen; pop. about 10,000. It grew up around the naval dockyard and military post inaugurated in 1869, and since used as the main station of the German navy. The port was laid out on swampy land purchased in 1853 from Oldenburg, and is diked against the sea. It has an inner and an outer basin, the latter flanked by piers 4,000 and 10,000 ft. long, and there are three dry docks for building and repairing ironclads, and factories for steam engines. The total cost of all the works when completed will probably reach $40,000,000.

WILHELMSHÖHE. See CASSEL.

WILIBALD ALEXIS. See HÄRING.

WILKES. **I.** A N. W. county of North Carolina, intersected by the Yadkin river; area, 864 sq. m.; pop. in 1870, 15,539, of whom 1,662 were colored. The Blue Ridge extends along the N. W. border, and the surface is diversified by mountains and valleys. The soil of the latter is very fertile, and that of the mountains is well adapted to pasturage. There is a great abundance of iron ore, and bituminous coal is found. The chief productions in 1870 were 24,134 bushels of wheat, 21,774 of rye, 202,590 of Indian corn, 42,691 of oats, 16,460 of Irish and 12,726 of sweet potatoes, 77,397 lbs. of butter, 12,040 of wool, and 32,238 of tobacco. There were 1,529 horses, 3,318 milch cows, 5,843 other cattle, 8,352 sheep, and 16,027 swine. Capital, Wilkesborough. **II.** A N. E. county of Georgia, bounded N. by Broad river and S. by Little river, and drained by their branches; area, 550 sq. m.; pop. in 1870, 11,796, of whom 7,827 were colored. The surface is undulating and the soil only moderately fertile. Iron ore, granite, and quartz are found. A branch of the Georgia railroad terminates at the county seat. The chief productions in 1870 were 22,867 bushels of wheat, 171,378 of Indian corn, 37,742 of oats, 16,970 of sweet potatoes, 79,469 lbs. of butter, 5,598 of wool, and 6,882 bales of cotton. There were 1,109 horses, 1,011 mules and asses, 2,237 milch cows, 4,731 other cattle, 3,487 sheep, and 9,436 swine. Capital, Washington.

WILKES, Charles, an American naval officer, born in New York in 1801, died in Washington, Feb. 8, 1877. He was appointed a midshipman in 1816, and served in the Mediterranean and the Pacific in 1819–'23. He was commissioned lieutenant in 1826, and appointed to the department of charts and instruments in 1830, and was the first in the United States to observe with fixed astronomical instruments. On Aug. 18, 1838, he sailed from Norfolk, Va., in command of a squadron of five vessels and a store ship, to explore the southern seas. He visited Madeira, the Cape Verd islands, Rio de Janeiro, Tierra del Fuego, Valparaiso, Callao, the Paumotou group, Tahiti, the Samoan group (which he surveyed and explored), Wallis island, and Sydney in New South Wales. He left Sydney in December, 1839, and made important discoveries in the antarctic regions. In 1840 he thoroughly explored the Feejee group, and visited the Hawaiian islands, where he measured the pendulum on the summit of Mauna Loa. In 1841 he visited the N. W. coast of America and the Columbia and Sacramento rivers, and on Nov. 1 set sail from San Francisco, visited Manila, Sooloo, Borneo, Singapore, the Cape of Good Hope, and St. Helena, and cast anchor at New York on June 10, 1842. Charges preferred against him by some of his officers were investigated by a court martial, and he was acquitted of all except illegally punishing some of his crew, for which he was reprimanded. He was made a commander in 1843. He published "Narrative of the United States Exploring Expedition, 1838-'42" (6 vols. 4to, also 5 vols. 8vo, Philadelphia, 1845; abridged, 1 vol. 8vo, New York, 1851). Of the remaining 11 volumes, giving the scientific results of the expedition, he was the author of that on meteorology. In 1849 he published "Western America, including California and Oregon" (8vo, Philadelphia), and in 1856 his "Theory of the Winds" (8vo, New York). He was made a captain in 1855. In 1861 he was sent to the West Indies in the frigate San Jacinto to look after the confederate steamer Sumter; and on Nov. 8 he took forcibly from the British mail steamer Trent, in the Bahama channel, Messrs. Slidell and Mason, commissioners of the Confederate States to France and England, and conveyed them to Boston. For this action he received a vote of thanks from congress; but his course was finally disapproved by the president, and the commissioners were surrendered to England. In 1862 he was commissioned as commodore and placed first on the list. While in command of the flotilla in James river he shelled and destroyed City Point on Aug. 28. In 1863 he commanded a special squadron in the West Indies and captured many blockade runners. He was commissioned as rear admiral on the retired list, July 25, 1866.

WILKES, John, an English politician, born in London, Oct. 17, 1727, died there, Dec. 27, 1797. He was the son of a rich distiller, and was educated at Hertford and Aylesbury, and afterward studied at Leyden. In 1757 he entered parliament, and in 1762 started the "North Briton" newspaper for the purpose of assailing the administration of Lord Bute. After that minister's downfall, the "North Briton" continued its attacks upon the government, Wilkes being aided, it is said, by Lord Temple and the poet Churchill. The king's speech at the close of parliament in 1763 claimed for Great Britain the merit of the peace closing the seven years' war. The "North Briton" charged the monarch with falsehood. Wilkes was arrested and committed to the tower, but in a few days was discharged by means of a writ of *habeas corpus*, on the plea of his privilege as member of parliament. The house of commons at the next session, however, declared the paper in question to be a seditious libel, ordered it to be burned, and passed a special law for the author's prosecution. The populace took up the side of Wilkes, and when the attempt was made to burn the obnoxious number a riot ensued. Wilkes also won his suit against the under-secretary of state for the seizure of his papers, the jury giving him £1,000 damages. In January, 1764, he was expelled from the house of commons; and the upper house having accused him of writing an obscene poem called an "Essay on Woman," he was tried before Lord Mansfield and found guilty, and, as he had fled to France, was outlawed. He returned to England four years afterward, and was again elected to parliament from Middlesex. He now gave himself up to the court of king's bench, but it refused to commit him. Having been at once rearrested, he was rescued from the officers by the mob, but voluntarily went into confinement. On the day when parliament met, a large crowd assembled in front of his prison to conduct him to the house of commons. A riot followed, and several of the mob were shot by the military. The sentence of outlawry was reversed by Lord Mansfield; but Wilkes was convicted of two libels, fined £1,000, and sentenced to 22 months' imprisonment. Having charged Lord Weymouth with planning "the horrid massacre in St. George's fields," as the quelling of the riot was called, he was again expelled from parliament, and a new election was ordered for Middlesex. Wilkes was returned without opposition, but the house declared him incapable of sitting. Three other elections had the same result, and at last the commons declared his opponent Col. Luttrell elected, on the ground that the votes cast for Wilkes were void. Wilkes, though in prison, now became the most popular man in England. His contest with the ministry was regarded as one for the preservation of the rights of the people. Costly presents were sent him, and £20,000 was raised to pay his debts. In November, 1769, a jury gave him £4,000 damages against Lord Halifax for false imprisonment. In April, 1770, he was set at liberty and elected alderman of London. He was twice commanded to attend at the bar of the house to answer for his conduct in that office, but refused to appear except as member for Middlesex. The house finally evaded the contest by summoning him to appear on April 8 and adjourning to the 9th. In 1771 Wilkes was elected sheriff of London, and in 1774 lord mayor; and in the latter year he was again elected to parliament for Middlesex and took his seat. From 1779 till his death he was chamberlain of London. In 1782 he succeeded in procuring the expunging of the resolutions of expulsion from the records, on the ground that they were subversive of the rights of electors. He published translations and editions of several classics. His "Letters to his Daughter" from 1774 to 1796 were printed in 1804; and in 1805 Almon published his correspondence in five volumes, with a biography.—See "Biographies of John Wilkes and William Cobbett," by the Rev. John Watson (London, 1870), and "Wilkes, Sheridan, and Fox: the Opposition under George the Third," by W. F. Rae (London, 1874).

WILKESBARRE, a city and the county seat of Luzerne co., Pennsylvania, on the E. bank of the North branch of the Susquehanna river, here crossed by a handsome bridge, about 100 m. N. by W. of Philadelphia; pop. within the present limits in 1870, 17,264. It is situated about midway of the Wyoming valley, is handsomely built, and is surrounded by fine scenery, which renders it a popular summer resort. It has street railroads, is lighted with gas, and is supplied with water from adjacent streams. The North Branch division of the Pennsylvania canal passes through the city, which communicates with New York, Philadelphia, and the west by the Lehigh and Susquehanna, the Lehigh Valley, and the Lackawanna and Bloomsburg (on the opposite bank of the river) railroads. It owes its prosperity to the immense deposits of anthracite in the vicinity. There are manufactories of cars, locomotives, mining engines and machinery, foundery products, carriages, chairs, miners' tools, organs, ale and beer, galvanized iron cornices, wire and hemp rope, pottery, railroad tools, &c. The city contains four national banks, with an aggregate capital of $1,200,000, and three savings banks with $850,000 capital. The principal charitable institutions are the city hospital and the home for friendless children. There are three graded public schools, a female seminary, a colored school, a high school, several select schools, and one daily and four weekly (two German) newspapers. The Wyoming historical and genealogical society has a collection of antiquities and geological specimens, and the Wyoming Athenæum a library of 1,500 volumes. There are 23 churches, viz.: 2 Baptist, 1 Congregational, 4 Episcopal, 1 Jewish, 2 Lutheran, 5 Methodist, 6 Presbyterian, and 2 Roman Catholic.—Wilkesbarre is a combination of the names of John Wilkes and Col. Isaac Barré, defenders of colonial rights in the British parliament. It was founded in 1772, and incorporated as a borough in 1806. The population of the borough in 1870 was 10,174, but in 1871 it received a city charter, and Wilkesbarre township (pop. 7,090) was annexed.

WILKIE, Sir **David,** a Scottish painter, born at Cults, Fifeshire, Nov. 18, 1785, died at sea, near Gibraltar, June 1, 1841. He was the son of the Rev. David Wilkie, who placed him in 1799 in the trustees' academy in Edinburgh, where he gained a prize for the best picture of "Callisto in the Bath of Diana." In 1805 he removed to London, and in 1806 exhibited his "Village Politicians" at the national academy. He exhibited "The Blind Fiddler" in 1807, "The Card Players" in 1808, and "The Cut Finger" and "Rent Day" in 1809. He was elected an associate of the royal academy in 1809, and an academician in 1811. His father died in 1812, and he assumed the support of his mother and sister. From this time till 1825 he painted most of his best pictures. Among these are "Blindman's Buff" (1813), "The Letter of Introduction" and "Duncan Gray" (1814), "Distraining for Rent" (1815), "The Rabbit on the Wall" (1816), "The Breakfast" (1817), "The Errand Boy" (1818), "The Penny Wedding" (1819), "Reading the Will" (1820), "Guess my Name" and "Newsmongers" (1821), "Chelsea Pensioners reading the Gazette of the Battle of Waterloo" (1822), "The Parish Beadle" (1823), "Smugglers offering Goods for Sale" and "The Cottage Toilet" (1824), and "The Highland Family" (1825). His "Chelsea Pensioners" was executed for the duke of Wellington for £1,200. In 1817 he visited Abbotsford and painted the well known group of "Sir Walter Scott and his Family." Passing three years on the continent, he exhibited in 1829 eight pictures, including the well known "Maid of Saragossa." His later pictures were not received with as much favor as his earlier ones. Among these are "John Knox preaching in St. Andrews," "Columbus submitting the Chart of his Voyage to the Spanish Authorities," "Peep-o'-day Boys," "Mary Queen of Scots escaping from Lochleven Castle," "Benvenuto Cellini and Pope Paul III.," and portraits of William IV., Queen Victoria, and the duke of Wellington. Most of his works in his later style are fading, while his early pictures are still unchanged. In 1830 he was made painter in ordinary to the king, and in 1836 he was knighted. He painted a portrait of the sultan in 1840, visited the Holy Land, and died on his voyage home and was buried at sea. His life has been written by Allan Cunningham (3 vols. 8vo, 1843).

WILKIN, a W. county of Minnesota, separated from Dakota by the Bois de Sioux and Red rivers, the latter of which also intersects it; area, about 900 sq. m.; pop. in 1870, 295; in 1875, 528. The surface is uneven and elevated, and the soil is productive. It is traversed by the St. Paul and Pacific railroad. Capital, Breckenridge.

WILKINS, Sir **Charles,** an English orientalist, born in Frome in 1749, died in London, May 13, 1836. He went to Calcutta in 1770, in 1778 made the type for printing Halhed's Bengalee grammar, and afterward made the matrices for a font of Persian type. He returned to England in 1786, was appointed librarian of the East India company in 1801, and knighted in 1823. He translated the *Bhagavad Gîtâ* (1785) and *Hitopadesa* (1787), wrote a Sanskrit grammar (1808) and "The Roots of the Sanskrit Language" (1815), and edited Richardson's Arabic and Persian dictionary (1806–'10).

WILKINS, John, an English prelate, born in 1614, died in London, Nov. 19, 1672. He signed the "Solemn League and Covenant," formed with Wallis and others in London a club which was the nucleus of the royal society, in 1648 became warden of Wadham college, Oxford, in 1656 married the widowed sister of Oliver Cromwell, and in 1659 was made master of Trinity college, Cambridge. He was ejected at the restoration, but Charles II. made him rector of St. Lawrence, Jewry, London, in 1662, and bishop of Chester in 1668. His principal works are: "The Discovery of a New World," containing arguments to prove the moon habitable (4to, London, 1638); "Discourse concerning a New Planet" (1640); "Mercury, or the Secret Messenger," an essay on modes of telegraphing (1641); "Mathematical Magic, or the Wonders that may be performed by Mechanical Geometry" (1648); "Essay toward a Real Character and a Philosophical Language" (1668); and "Principles and Duties of Natural Religion" (1675). He invented and described the perambulator or measuring wheel.

WILKINSON. I. A central county of Georgia, bounded N. E. by the Oconee river and drained by its affluents; area, 430 sq. m.; pop. in 1870, 9,383, of whom 4,699 were colored. The surface is undulating and diversified by extensive pine forests, and the soil is moderately fertile. Sulphur and chalybeate springs are found. It is intersected by the Georgia Central and the Milledgeville and Eatonton railroads. The chief productions in 1870 were 2,668 bushels of wheat, 182,164 of Indian corn, 22,553 of peas and beans, 32,919 of sweet potatoes, 26,286 lbs. of butter, 3,747 of wool, and 5,115 bales of cotton. There were 953 horses, 1,948 milch cows, 5,060 other cattle, 1,558 sheep, and 11,566 swine. Capital, Irwinton. **II.** The S. W. county of Mississippi, bordering on Louisiana, bounded W. by the Mississippi river, and N. by the Homochitto; area, 580 sq. m.; pop. in 1870, 12,705, of whom 10,007 were colored. It has an uneven surface, and the soil is extremely fertile. It is intersected by the West Feliciana railroad. The chief productions in 1870 were 158,859 bushels of Indian corn, 25,487 of sweet potatoes, 19,577 lbs. of butter, and 12,430 bales of cotton. There were 2,220 horses, 1,537 mules and asses, 7,844 cattle, 2,078 sheep, and 6,946 swine. Capital, Woodville.

WILKINSON, James, an American soldier, born in Maryland in 1757, died near the city of Mexico, Dec. 28, 1825. He studied medicine and began practice, but in 1775 joined a rifle company before Boston, and soon became captain in a New Hampshire regiment. In 1776 he joined Arnold in Canada, and in 1777 served as adjutant general on Gen. Gates's staff. He was brevetted brigadier general in November. In January, 1778, he became secretary of the board of war, but quarrelled with Gates, and resigned. In 1779 he was made clothier general of the army. In 1791 he served as colonel in an expedition against the Wabash Indians; in March, 1792, became brigadier general; commanded the right wing of Wayne's army in the battle of the Maumee, Aug. 20, 1794; and in December, 1796, became general-in-chief. He was governor of Louisiana in 1805-'6, afterward protected the S. W. frontier against Spanish incursions, and at New Orleans was employed to defeat the plans of Aaron Burr. On charges of complicity with Burr and receiving bribes from Spain, he was tried and acquitted in 1811. In 1813 he reduced Mobile, and was then ordered to the northern frontier, where his operations against Canada were totally unsuccessful, mainly, as it appeared, from lack of concert with Gen. Wade Hampton. He was superseded, and on charges preferred by the secretary of war in February, 1814, he was tried by court martial at Troy in 1815, and honorably acquitted. He published his "Memoirs" in 1816 (3 vols. 8vo), and spent his later years in Mexico.

WILKINSON, Jemima, an American fanatic, born in Cumberland, R. I., in 1753, died at Jerusalem, Yates co., N. Y., July 1, 1819. She was educated as a Quaker. At the age of 20, after a severe fever and an apparent suspension of life, she professed to have been raised from the dead, and pretended to work miracles. She was attractive and shrewd, and obtained many followers and held them in subjection, insisting upon the Shaker doctrine of celibacy. She assumed the name of "universal friend," was accompanied by two "witnesses," Sarah Richards and Rachel Miller, and in her religious meetings adopted Shaker forms. In 1786 her followers resolved to found a colony in what is now the town of Torrey, Yates co., N. Y. In 1789, 14,000 acres were purchased, to which the town of Jerusalem was afterward added. At her death the sect was entirely broken up.

WILKINSON, Sir John Gardner, an English Egyptologist, born Oct. 5, 1797, died Oct. 29, 1875. He was educated at Harrow and at Oxford. During a residence of 12 years in Egypt he made a profound study of its ruins and topography, as also of the languages, manners, and customs of the modern inhabitants. He published "Materia Hieroglyphica" (Malta, 1828), "Topography of Thebes and General View of Egypt" (London, 1835), and "Manners and Customs of the Ancient Egyptians," his great work (1st series, 3 vols. 8vo, 1837; 2d ed., 1842; 2d series, 3 vols., 1841; 3d ed. of both series, 5 vols., with 600 illustrations, 1847; new ed., edited by Dr. Birch, 1876). He was knighted in 1840. In 1843 appeared his "Modern Egypt and Thebes" (2 vols. 8vo; 2d ed., 1844). In 1847, and again in 1857, new editions of this work were published in a condensed and corrected form under the title of "A Hand Book for Travellers in Modern Egypt." In 1848 he published "Dalmatia and Montenegro" (2 vols. 8vo), to which succeeded the "Architecture of Ancient Egypt," &c. (8vo, 1850), accompanied by a large volume of plates; "Fragments of the Hieratic Papyrus at Turin" (1851), with a folio volume of plates; and an abridgment of his large work entitled "A Popular Account of the Ancient Egyptians" (2 vols. 12mo, 1854). In 1855-'6 he revisited Egypt, and on his return to England published "The Egyptians under the Pharaohs," which forms a supplement to the "Popular Account" (8vo, 1857). In 1858 he published a treatise on "Color, and the General Diffusion of Taste among all Classes." In 1874 he presented his collection of coins to Harrow school; he had previously given it his Egyptian, Greek, and other antiquities. He contributed many of the notes to Rawlinson's version of Herodotus, and published papers in the "Transactions" of the geographical and archæological societies of Great Britain. His life has been published by his widow (London, 1876).

WILKINSON, John James Garth, an English author, born in London in 1812. He was educated at a private school, studied medicine, and became a practising physician of the homœopathic school. He has published translations of Swedenborg's *Regnum Animale* (London, 1843-'4; American ed., 1850), and of some of his other scientific works; "Swedenborg, a Biography" (1849); "The Human Body and its Connection with Man" (1851); "War, Cholera, and the Ministry of Health" (1854); "Improvisations from the Spirit," a volume of poems (1857); and "Methods of Human Science and Divine Revelation" (1876).

WILL, in law, the written instrument wherein a man declares his wishes in respect to the disposition of his property after his death. There is good reason to believe that the right of inheritance, or of descent to the children or kindred of the deceased, was firmly established and allowed earlier than the right of disposition by will. Blackstone says that until "modern times" a man could only dispose of one third of his personal property away from his wife and children, and, in general, no will of lands was permitted until the reign of Henry VIII. But it seems to have been the law in those early ages that a man's "goods," or, as we now call it, his personal property, was divided at his death, if he left a wife and children, into three parts, his wife taking one, his children jointly one, and the third being at his disposal by his will or testament. If he left a wife and no child, she took one half, and he could dispose of the other; and if he left a child or children, but no wife, they took one half, and he could dispose of the other; and if he left neither wife nor child, he could dispose of the whole. If he died intestate, the king, as *parens patriæ*, took possession of his personals. At first the king administered them through his common officers of justice, but at an early period he gave this power first perhaps to the county courts, but either originally or soon to his prelates. The bishops exercised it in their own courts, which were held either by them in person, or by their "ordinary," as the officer discharging this function was called. This word "ordinary" came to mean in England principally an ecclesiastical officer having judicial power. In some parts of the United States it is used as the designation of the judge who has jurisdiction in the matter of wills and administration. He is also in some states known by the title of surrogate, in others is called a judge of probate, and in others register of wills.—The general rule is, that all persons having property may dispose of it by will. To this rule there are important exceptions, relating principally to infants, persons of insufficient mind, and married women. At common law infants could not dispose by will of real estate, though males of 14 and females of 12 might dispose of personalty; but by statute 1 Victoria, ch. 26, no will made by any person under 21 years of age is valid. The common law is variously modified in the different states of the Union, but there is a prevalent tendency toward the rule now in force in England; it is expressly adopted in many states, and there are many reasons which favor that rule.—What incapacity of mind invalidates a will is among the most difficult and most contested questions of law. All the resources not only of law, but of metaphysics and psychology, have been brought to bear upon the consideration of the question, What is a sound and disposing mind? It is certain that mere weakness of intellect will not deprive one of the power to make a will, nor will serious defects of memory, if the party still retains a recollection of those who would naturally be the objects of his bounty. A lunatic may make a will in a lucid interval, even though under guardianship, and a monomaniac may make one, though if his mania seems to have controlled its provisions it will be invalid. The apparent reasonableness or unreasonableness of the provisions of a will is often allowed to have a controlling influence when the validity of a will made by one of impaired understanding or of alleged mental unsoundness is in question.—A married woman cannot, by common law, make any will whatever except with the husband's assent, and then it is rather his will than hers. But this rule has received much modification in England, and much more in many of the United States. In a few of the states her common law disability remains almost entire; in most it is diminished by permitting her to exert some power of disposition over some part of her property; while in many she is allowed all the power which may be exercised by any other person.—No especial form of words is necessary to constitute a will or a legacy. It is always enough if the language used, however unusual or ungrammatical, convey with distinctness the intention and desire of the testator. Nor need the instrument be called, or in its form appear to be, a will or testament, if it was evidently intended to take effect after the death of the party executing it. As to the execution and attestation of wills, the law is far more stringent. The provisions of the statute of frauds are generally adopted in the United States. The will must be signed in presence of two witnesses, and in many of the states of three. But sometimes by statute exception is made where the will is wholly in the handwriting of the testator, especially if it be found among his papers, or disposes of personalty only. A seal is not usually required by statute, and when not so required is not necessary to the validity of the will. A mark may be a sufficient signature of the testator or a witness; but it is unusual and perhaps unsafe to have a witness who cannot or will not write his name. Against the name of every witness his residence or address should be written, as a great convenience, where it is not required by law; but the absence of this, even where it is required, does not invalidate the will. The attestation must (with the exception of a few states) be in the presence of the testator, but not necessarily in the same room, if he is so placed as to see the act; and he must have sufficient possession of his senses to know and understand the act of attestation. If he is blind, and the will is read to him and the attestation stated to him in good faith, this is sufficient. Nor is it necessary that he should actually see the attestation if he might do so. The execution of the will must under some statutes be "published" in the presence of the witnesses; which means that the testator must declare the instrument to be his will, or in some way inform the witnesses of this fact, when they attest it. And it has been held that the distinct acknowledgment or recognition by the testator of the will, in presence of the witnesses, is equivalent to a signing by him before them.—As to revocation, the common law rule was, that a marriage and the birth of a child after the execution of a will revoked it; and this rule has much force in this country now, although it is variously modified by statute. So, too, it is a general rule that any children not mentioned in the will, or in any wise provided for thereby, take the share of the estate which would come to them if the father had died intestate. By the statute of frauds, a will was effectually revoked by burning, cancelling, tearing, or obliterating, by the testator himself, or in his presence and by his directions; and it was not necessary that any witnesses should be present. In most, if not all the United States, the same rule prevails, and extends to any voluntary destruction of the will, as it does now by statute in England. No mere intention or desire or even belief of revocation has the effect of revocation, without some act; but a very slight act, a little tearing, or burning, or obliteration, will have this effect, if it is proved to have been done for the purpose and in the belief of cancellation. Whatever may be done, even if it be the actual destruction of the will, will not revoke it, unless the act be done *animo cancellandi.* Therefore the testator must have sufficient mind to know what he does; and consequently, if he destroys it in a fit of insanity, or by mistake for another paper, or without knowing that what he does will have the effect of cancellation, the will is not revoked. A will is always regarded, in the language of the law, as an ambulatory instrument, or as going always with the testator, and as being open to amendment, variation, or destruction by him, at his own pleasure, during his life; and a will is always revoked by a subsequent will incompatible with the prior will; but if the subsequent will does not expressly revoke the former, the two may stand together so far as they are not inconsistent. A will once revoked, but not destroyed, may be given validity by a new attestation by witnesses, at the testator's request; and this is called a republication. A codicil to a will may also have the effect of a republication, if the codicil is executed with the formalities required in a will.—The first principle in the construction of a will is to give effect to the intentions of the testator, disregarding so far as may be necessary any mere technical rules, such as are sometimes applied to other instruments. If clauses seem repugnant, they will be reconciled if possible; but if that cannot be done, effect is given to the last clause, as expressing presumptively the last intention of the testator. Words and names are sometimes transposed, or even changed, where the obvious intention of the testator requires it. Thus "or" is not unfrequently read as "and." In one English case, not only was "all" changed into "any," but the phrase "without issue" was converted into its exact opposite, "leaving issue." But the intention on the face of the will must be clear to warrant such rulings. It has been said, in some cases, that all conditions in a will which act in restraint of marriage are absolutely void; but a condition that a widow shall not marry, or shall not marry a certain person named, has in other cases been held good. It is indeed quite certain that an annuity or other provision for a wife, "as long as she shall remain my widow," is common, and would probably be regarded as valid by most of the courts of this country, if not by all. Still, clauses and provisions are not unfrequently declared to be void, because repugnant to the principles or policy of the law. It is a familiar and well established rule, that while words of grant to a person without the words "and heirs" give to the grantee by deed only an estate for his own life, the same words in a will give to the devisee an estate in fee, because the law supplies the words of inheritance. (See LEGACY, PROBATE, &c.)

WILL, a N. E. county of Illinois, bordering on Indiana, intersected by the Kankakee and Des Plaines rivers, which unite near its W. border to form the Illinois; area, 828 sq. m.; pop. in 1870, 43,013. It has a level surface, consisting mostly of prairie land, and is extremely fertile. Fine building stone is found. It is traversed by the Illinois and Michigan canal, the Illinois Central, the Chicago and Alton, the Chicago, Rock Island, and Pacific, and the Chicago, Danville, and Vincennes railroads. The chief productions in 1870 were 197,282 bushels of wheat, 1,131,458 of Indian corn, 1,868,682 of oats, 44,568 of barley, 224,845 of potatoes, 1,397,805 lbs. of butter, 62,442 of wool, and 106,196 tons of hay. There were 17,438 horses, 18,193 milch cows, 24,506 other cattle, 16,409 sheep, and 21,475 swine; 9 manufactories of agricultural implements, 3 of bricks, 16 of carriages and wagons, 4 of iron castings, 3 of machinery, 12 of saddlery and harness, 1 of woollens, 9 flour mills, 2 tanneries, 4 breweries, and 3 planing mills. Capital, Joliet.

WILLAMETTE RIVER. See OREGON.

WILLARD, Emma (HART), an American educator, born in Berlin, Conn., Feb. 23, 1787, died in Troy, N. Y., April 15, 1870. At the age of 17 she opened a school in Berlin, and in 1807 took charge of an academy in Middlebury, Vt. In 1809 she married Dr. John Willard, and gave up teaching; but in 1814 she opened a boarding school in Middlebury. In 1818 she sent to Gov. Clinton of New York a plan for a female seminary. In his next message the governor recommended an appropriation by the legislature, and an act was passed giving to female academies a share in the literature fund, and incorporating a female academy at Waterford. Mrs. Willard removed to that place, and published "A Plan for Improving Female Education" (1819). But special aid was not granted her, and in 1821 she removed to Troy. In 1838 she left the seminary and removed to Hartford, Conn. She had married Dr. Yates as her second husband, but was divorced in 1839, and resumed her former name. Besides several school books, she published a "History of the United States" (New York, 1828); "Poems" (1830); "Journal and Letters from France and Great Britain" (1833); "Universal History in Perspective" (1837); "On the Circulation of the Blood" (1846); "Respiration and its Effects" (1849); "Last Leaves of American History" (1849); "Astronography" (1853); and "Morals for the Young" (1857). Her life has been written by John Lord (New York, 1873).

WILLDENOW, Karl Ludwig, a German botanist, born in Berlin in 1765, died there, July 10, 1812. He was professor of natural history at the medical college in Berlin from 1798 to 1812, and subsequently of medicine at the university. His principal works are *Grundriss der Kräuterkunde* (Berlin, 1792; 7th ed., 1831), and a new edition of Linnæus's *Species Plantarum*, with the addition of plants discovered since the publication of that work in 1753, and arranged after the Linnæan system (6 vols., 1798–1826; vols. v. and vi. completed by Link).

WILLEMS, Florent, a Belgian painter, born in Liége about 1812. He studied at the academy of Mechlin, and in 1839 settled in Paris. He excels in genre pictures, and his female costumes are especially fine. His best known pieces include "A Musical Party," "The Coquette," "Visit of Maria de' Medici to Rubens," "The Betrothal Ring," "The Armorer," "The Widow," "The Message," "The Farewells," "I Was There," "The Intimate Friends," "The Confidence," "The Sortie," "The Messenger," and "The Visit."

WILLIAM I., surnamed the CONQUEROR, king of England, the first of the Norman dynasty, born at Falaise, Normandy, in 1027, died in Rouen, Sept. 9, 1087. He was the bastard son of Robert I. or II., duke of Normandy, called "Robert the Devil," and a young woman of Falaise, a tanner's daughter, named Arletta. Robert caused the Norman barons to receive William as their duke during his own lifetime, prior to his departure for the Holy Land. William was left an orphan at the age of eight, and his youth was passed amid wars and dissensions. Henry I. of France, at whose court he had spent his childhood, was sometimes his friend and sometimes his enemy. In 1047, with Henry's help, he defeated the Burgundian Count Guy at the battle of Val des Dunes, and he aided the French king against the count of Anjou. For several years William carried on contests with France, Anjou, and Brittany, increasing his dominions and reputation. Though of illegitimate origin, he claimed the throne of England through Emma, sister of his grandfather and mother of Edward the Confessor; and when Harold, son of Earl Godwin, visited the Norman court in 1065, he was compelled to swear fealty to William and to promise to support him. Edward the Confessor, it is asserted, had recognized William's claim, to the exclusion of the feeble Edgar Atheling; but on Edward's death in 1066, Harold procured his own elevation to the throne. William then prepared to enforce his pretension by arms. He overcame the opposition of his barons, gained the sanction of the pope, and enlisted thousands of military adventurers. A large fleet was assembled, and on Sept. 28, 1066, William landed at Pevensey near Hastings with 60,000 men. Harold had been engaged in the north, fighting his brother Tostig and the Norwegians, but arrived before William's camp on Oct. 13; and on the next day was fought the battle of Senlac or Hastings, in which, after an obstinate contest, the Saxons were defeated and their king was slain. William promptly advanced to London, where he was crowned, Dec. 25. At first his rule was mild and just, yet he was careful to keep all power in the hands of the Normans. The Saxon nobles, relying upon foreign aid, having leagued against him, he laid waste the whole country between the Tees and the Humber, and caused the death of 100,000 people. The Saxons were now treated as a conquered nation. The curfew bell, on the ringing of which all fires and lights were to be extinguished, was introduced in 1068. The religious houses were plundered, and the principal Saxon clergy deposed or banished to make room for foreigners. An invasion of Scotland in 1072 led to the submission of that country. An armed conspiracy of the Norman nobles in England was defeated. An attempt to subdue Brittany failed, and William gave his daughter Constance in marriage to the count. The dissensions between the king and his son Robert Courthose began in 1074; and in the war that followed, Robert had the support of the young nobility and of the king of France, in his demand for the sovereignty of Normandy and Maine. Concessions to Robert did not procure peace, and for years he was at the head of a party striving to deprive his father of his continental possessions. In 1081 William led an expedition into Wales. Most of the latter part of his reign he passed in Normandy, leaving England to be governed by his half brother Odo, bishop of Bayeux. William allowed Peter's pence to be collected in England, but refused to take the oath of homage to the pope. In 1079 he formed the New forest, driving a vast number of people from their homes. Between 1080 and 1086 was made a complete survey of England. (See Doomsday Book.) Toward the close of his reign William had trouble with the nobility of Maine, and made peace with them on their own terms. His last dispute was with the king of France, some of whose vassals had plundered Norman territory. In retaliation he burned Mantes. While he was riding over the still smoking ruins, the plunging of his horse, throwing him upon the pommel of the saddle, caused a dangerous rupture. Before his death, which occurred several weeks after at a monastery in Rouen, William gave large sums of money for rebuilding the churches of Mantes, and in his will distributed treasures to cloisters, churches, and the poor. He was buried at Caen in the church of St. Stephen, which he had built in 1064. Blackstone explains the origin of the surname Conqueror by reference to feudal and Norman law, as denoting one who acquired an estate by any means aside from the common course of inheritance. In his lifetime the king was generally known as William the Bastard, an appellation of which he was not ashamed. A monument to him was erected at Falaise in 1876.

WILLIAM II., commonly known as William Rufus from his red hair, third son and successor of the preceding, born in Normandy about 1056, slain in the New forest, Aug. 2, 1100. While his father was dying he hastened to England, and easily became king, owing to the slackness of his elder brother Robert, and was crowned in Westminster abbey, Sept. 26, 1087. At first he was popular with his English subjects, who aided him against Robert in 1088, William promising to restore the laws of Edward the Confessor; but after the death of Lanfranc, who had been his early instructor, he began to oppress both the people and the church. The expenses of his court were very great, and large sums were lavished upon public works. He completed the tower of London and Westminster hall, and built London bridge. In 1090 he invaded Normandy, but the king of France mediated a peace between the brothers, who then turned their united arms against their brother Henry. (See Henry I.) Returning to England, William repelled invasions of the Welsh and Scotch, and made an unsuccessful incursion into the country of the latter. In 1093 King Malcolm of Scotland, having invaded England, was defeated and slain, together with his eldest son; but William Rufus protected the family of Malcolm and aided in restoring his younger son to the Scottish throne. A new war with Robert broke out in 1094, and William invaded Normandy, but without success, being recalled to England by a Welsh insurrection, and detained there by a rebellion in the north, headed by Mowbray, earl of Northumberland. In 1096 the king obtained Normandy as a pledge for 10,000 marks lent to Robert to enable him to join the first crusade; but this involved him in continual war with France and with Maine, which he claimed as part of his new territory. Returning to England in 1097, he had a violent quarrel with Anselm, archbishop of Canterbury, whom he had previously sought to displace, and robbed him of the income of his see. He still further disgusted his subjects by selling bishoprics to the vilest of men. In 1100 the count of Poitiers offered to pledge all his dominions to William for money to convey his army to Palestine, and the king eagerly embraced the offer. While he was fitting out a great fleet with which to take possession of the new countries that invited his rule, he went hunting in the New forest. Here he was shot by Walter Tyrrel, lord of Poix and seneschal of Pontoise, and died instantly. The received account calls it an accident, but it is more probable that he was assassinated. The character of William Rufus is not easy to draw, for he had plundered the church and oppressed the clergy, and they furnished the only writers of that age. He left no legitimate issue, being unmarried, and was succeeded by his younger brother as Henry I.

WILLIAM III., king of England and stadtholder of Holland (William Henry of Nassau, prince of Orange), born at the Hague, Nov. 4, 1650, died in Kensington, March 8, 1702. He was the son of William II., prince of Orange, and the princess Mary of England, eldest daughter of Charles I. The house of Orange had long sought to obtain supreme power in Holland, a country which its greatest member had freed from the Spanish yoke. The death of William II. eight days before the birth of his son had put a stop to his projects for the establishment of a despotism over the republic, and threw the power into the hands of the opposite party. There was no member of the Orange family of sufficient influence to be elected stadtholder or to maintain its policy, and for years that party was depressed, the republic being governed by Jan de Witt, grand pensionary. The attack upon Holland by France and England in 1672 changed everything. The prince of Orange was immediately and unanimously appointed captain and admiral general of the United Provinces. In the long and severe conflict which ensued, the allies were at first successful; but the ability of William as a general, and still more as a diplomatist, detached England from the alliance and brought her over to the side of the Dutch, and led to the honorable peace of Nimeguen (1678). In November, 1677, William married his cousin Mary, eldest daughter of James, duke of York, heir presumptive to the British crown. This union was very popular in both countries, the prince being regarded as the natural head of the Protestant party, and his wife being expected to succeed to the English throne. The lifelong policy of William was already indicated, which was to lessen the power of France, which under Louis XIV. had become dangerous to all Europe, and the most dreaded foe of Protestantism. The prince consequently strove to sever the relations between England and France, a design approved of by most Englishmen. A breach was inevitable, however, between him and his father-in-law, whenever the full bearing of his plan should become known to the latter. James, on ascending the throne (1685), was determined to restore the old religion and to establish arbitrary power. Holland became the place of refuge for all the discontented English. The national dissatisfaction having reached its height, the prince of Orange was on June 30, 1688, invited by a number of prominent English statesmen to enter England with an army. He assembled a large fleet and an army 15,000 strong, and landed at Torbay, Nov. 5. Soon the whole country was at his side, and James was a fugitive. A convention of the estates of the realm of England, in February, 1689, called William and Mary to the throne. In Scotland his cause was equally triumphant. The early part of William's rule was unfortunate. The adherents of James availed themselves of troubles in Scotland to work against the new sovereigns, and James himself went to Ireland, where his coreligionists enthusiastically received him, and nearly the whole island came again into his possession. England joined the coalition which William, as stadtholder of Holland, had formed with Austria, Spain, and other states against France, and declared war, May 7, 1689. In Ireland, notwithstanding the raising of the siege of Londonderry and the victory at Newton Butler, the year closed favorably to James. But in 1690 William himself took command, and at the battle of the Boyne, July 1 (O. S.), James was defeated, and fled to France. William was, however, repulsed before Limerick, the French were victorious at Beachy Head, and the forces of the coalition were beaten at Fleurus. Quiet was restored in Scotland after the death of Dundee, the only capable leader of the highlanders. The measures taken for the maintenance of peace in that wild country, under Sir John Dalrymple, led to the massacre of the Macdonalds in 1692, a transaction usually thought to have left a stain on William's reputation. (See Glencoe.) Ireland was subdued by Ginkel in 1691, and William went to the continent, where the war was continued till the autumn of 1697 with but little advantage to the allies, who lost Namur, and were defeated at Steenkirk in 1692, and in the battle of Neerwinden or Landen in 1693. In both the latter actions William commanded, and his genius and energy shone bright in defeat. A powerful French fleet was destroyed at the naval battle of La Hogue in 1692. Queen Mary (see Mary II.) died on Dec. 28, 1694, and William became sole sovereign. He retook Namur in 1695, and concluded peace at Ryswick in September, 1697, both parties being exhausted, and neither having gained much. During the whole war William had been disturbed by Jacobite plots, some of them against his life. The bank of England had been created, and ministerial responsibility recognized. The liberty of the press was established, the coinage purified, a standing army constitutionally formed, and the independence of the judiciary secured. During a period when most English statesmen were corrupt, and while many in William's service were in correspondence with James, the English constitution was placed on a firm basis. The remainder of William's life was passed in disputes with parliament or in continental diplomacy, his chief object still being to check the power of France and to strengthen that of the Netherlands. He was the chief agent in the negotiations providing for the settlement of the Spanish succession. The terms of the second treaty were broken by Louis XIV., who accepted the Spanish crown for his grandson the duke of Anjou. Still further, on the death of James II. Louis acknowledged his son king of Great Britain and Ireland. This enraged the English, and William was preparing for war when he was thrown from his horse, Feb. 21, 1702, and received injuries which caused his death. William, having no heir, promoted the act of settlement, calling the house of Hanover to the throne, which was adopted by parliament in 1701, and completed the English revolution. His immediate successor in England was his sister-in-law Anne, while in Holland the stadtholderate was suspended for many years. William was wary, thoughtful, and taciturn, hiding a naturally fiery temper under a phlegmatic exterior. He was courageous and fond of business, cared little for pleasure, was little interested in letters, and was decided in his theological opinions, yet not illiberal.

WILLIAM IV. (William Henry), king of Great Britain and Ireland, fifth sovereign of the Hanoverian line, born in London, Aug. 21, 1765, died at Windsor, June 20, 1837. He was the third son of George III., and entered the navy June 15, 1779, as midshipman, on board the Prince George, which, being attached to Admiral Rodney's fleet, took part in two actions against the Spaniards. He served again in the channel fleet and in the fleet sent in 1781 to relieve Gibraltar, and in 1782 arrived at New York in the Prince George. Subsequently he served in the West Indies, having been transferred to the Warwick. In June, 1785, he was made a lieutenant, and in April, 1786, post captain in command of the Pegasus, and served under Nelson in the West Indies. Having gone north without orders, he was punished on his return to England by confinement within the limits of Plymouth garrison, and by being sent abroad again to the Halifax station and the West Indies. He returned to England early in 1789, was made duke of Clarence, and took his seat in the house of lords on June 8. An income of £12,000 was settled upon him by parliament. When war with Spain was threatened, the duke of Clarence was appointed to the command of the Valiant of 74 guns, and later was made rear admiral of the blue. In 1801 he reached the rank of admiral of the fleet. In the house of peers he seldom spoke except upon naval affairs; but he opposed the abolition of the slave trade, supported the peace of Amiens, and also the renewal of war with France in 1803, and in 1811 protested against the regency bill. At the close of 1813 he commanded on the Dutch coast, supporting Sir Thomas Graham against the French, and was slightly wounded. In 1818 he married the princess Adelaide of Saxe-Meiningen. On the trial of Queen Caroline he supported the king, and was severely handled by the queen's counsel. The death of the duke of York in 1827 made the duke of Clarence heir presumptive, and the Canning ministry revived for him the office of lord high admiral, which he held till September, 1828, although without a seat in the cabinet. He was foremost among the supporters of Catholic emancipation. On June 26, 1830, he became king, a month before the French revolution. In England the tories were overthrown, and the whigs under Lord Grey came into power, pledged to parliamentary reform. After a severe struggle the reform bill received the royal assent, June 7, 1832, and soon after the West India slaves were emancipated. The Grey ministry came to an end in 1834, when Lord Melbourne, also a whig, became premier; but the latter was dismissed the same year, the king having become alarmed by the political aspect, and being also strengthened by a conservative reaction. The new ministry, under Sir Robert Peel, was unable to maintain itself, and after a few months the Melbourne administration was restored. Reforms were made in the Irish church, the English municipal reform bill was passed, and relief was granted to the dissenters. William was about to change ministers again when he died. Having no legitimate issue, he was succeeded by his brother the duke of Cumberland in Hanover, and by his niece Victoria in Great Britain. By his mistress Mrs. Jordan he had five sons and five daughters, who were known by the name of Fitz-Clarence. The eldest was created earl of Munster, and was a major general in the army; the other sons held high positions, and the daughters all married among the aristocracy.

WILLIAM I. (WILHELM FRIEDRICH LUDWIG), king of Prussia and emperor of Germany, born March 22, 1797. He is a son of Frederick William III. and of the celebrated queen Louisa, and in early life accompanied the armies which overthrew Napoleon I. After the accession of his childless brother, Frederick William IV., in 1840, he became known as heir apparent and prince of Prussia; he was invested with high office and sat in the first united diet in 1847. Chiefly on account of his fondness for the army, he was regarded as an absolutist in March, 1848, and withdrew to England till June, when, the excitement in Berlin having subsided, he took a seat as a deputy in the national assembly. On June 12, 1849, an unsuccessful attempt was made upon his life at Nieder-Ingelheim, while he was on the way to Baden to take command of the Prussian forces. He put down the republican insurrection in a few weeks. Subsequently he was stationed at Coblentz as military governor on the Rhine and in Westphalia, and also became governor of the federal fortress of Mentz and grand master of the freemasons. On important occasions he was called to Berlin to confer on state affairs, and his loyal nature was soon generally recognized. His brother being disabled by illness in 1857, he acted in his stead, and in October, 1858, was formally installed as regent; and he succeeded him as king on Jan. 2, 1861. In July another abortive but graver attempt upon his life was made at Baden-Baden by the student Oskar Becker, who charged him with incapacity to effect the union of Germany, the accomplishment of which, however, became the salient feature of his reign. With the assistance of Von Roon he paved the way for victory by the reorganization of the army, and in 1862 he placed Bismarck at the head of the cabinet as minister of foreign affairs. After procuring in 1864 the coöperation of Austria in the Schleswig-Holstein war, he achieved a great victory for Prussia, and the convention of Gastein (Aug. 14, 1865) assigned Schleswig temporarily to him, and Lauenburg permanently. His sagacity in selecting able ministers and generals was equalled only by his firmness in sustaining them against all opposition; and his confidence in Bismarck as well as in Von Roon and Moltke was fully confirmed by the rapid and brilliant success of the war of 1866 in conjunction with Italy against Austria, in which he personally took an active part, and which extinguished Austria as a German power, and placed him at the head of the new North German confederation, with Schleswig-Holstein, Hanover, Hesse-Cassel, Nassau, and Frankfort added to his Prussian dominions. On Feb. 24, 1867, he opened the constituent Reichstag, and on July 1 he made Bismarck chancellor. In the preceding month he and his nephew, the emperor Alexander II. of Russia, had visited Napoleon III. on occasion of the Paris exposition. The friendly relations between Prussia and Russia were subsequently strengthened, the two chancellors, Bismarck and Gortchakoff, being as much in accord as the two monarchs; and this good understanding was of the greatest moment in the ultimate victory over France and the attainment of German unity. The king also took every opportunity to vindicate the historic position of his dynasty as protector of the Protestant faith. The candidature of Prince Leopold of Hohenzollern for the Spanish throne, and the king's objections against further interviews with the French ambassador, Count Benedetti, who had repeatedly importuned him at Ems (July, 1870), became the pretext for the French declaration of war against Prussia. The South German states at once joined the North German confederation against France, under the lead of Prussia, and the war was a continuous series of prodigious victories. (See France.) William, accompanied by Bismarck, Von Roon, and Moltke, was with the German armies from the beginning to the end of the contest, and received at Sedan (Sept. 2) the surrender of Napoleon III. On Oct. 5 he fixed his headquarters in the palace of the former French kings at Versailles, and here, on Jan. 18, 1871, he was proclaimed emperor of Germany. After signing the preliminaries of peace, Feb. 26, he intimated to the emperor of Russia that Germany would never forget the service rendered by his strict neutrality. The treaty was ratified on March 1 and 2, and the emperor left Versailles on the 7th. He entered Berlin on the 15th, and on the 21st opened the first Reichstag of the new empire. The definitive peace with France was signed at Frankfort May 10, and on June 9 appeared the emperor's proclamation incorporating Alsace-Lorraine with the empire. On Aug. 16, 1875, the emperor unveiled Bandel's colossal monument of the national hero Arminius, on the summit of the Grotenberg near Detmold. After exchanging visits with the emperor of Austria, he reached Milan on Oct. 18, to return the visit of the king of Italy, his good relations with Victor Emanuel being of special importance in view of the increasing magnitude of the emperor's contest with the Roman hierarchy. Early in 1876 he joined the emperors of Austria and Russia in the project of reform suggested to Turkey for the pacification of her revolted provinces. Monuments in his honor have been erected all over the empire. His life has been written by Schneider (4th ed., 1868) and Weisshuhn (8th ed., 1869). L. Schmidt has written his military history, embracing the years 1867–'71 (*Militärische Lebensbeschreibung*, Berlin, 1875–'6). By his wife, the empress Augusta (daughter of the grand duke Charles Frederick of Saxe-Weimar-Eisenach, born Sept. 30, 1811, and married June 11, 1829), he has one son, the crown prince (see Frederick William Nicholas Charles, vol. vii., p. 462), and one daughter, the princess Louisa, born Dec. 3, 1838, who married in 1856 the grand duke Frederick of Baden.

WILLIAM I. (Frederik Wilhelm), first king of the Netherlands, grand duke of Luxemburg, born at the Hague, Aug. 24, 1772, died in Berlin, Dec. 12, 1843. His mother was a niece of Frederick the Great, and his father was the last stadtholder of the republic, as William V. As prince of Orange he had command of the Dutch army till 1795, when, the country being conquered by France, he joined his father at Hampton court, and subsequently went to Berlin. In 1802 he received from his father the principality of Fulda and other territories which had been given to him in compensation for the Netherlands, but lost them in 1806 for refusing to join the Rhenish confederation. His father died in the same year. He became a Prussian general, fell into the hands of the French at the battle of Jena, but was released, and served under the Austrians at Wagram in 1809. On the downfall of Napoleon he was, in conformity to the resolutions of the congress of Vienna, declared king of the Netherlands by an assembly of notables as William I., March 16, 1815, under a limited constitution, and with Belgium included in the new kingdom; and at the same time he exchanged his German possessions for the grand duchy of Luxemburg. The Belgians having established their independence with the aid of France (1830–'32), he stubbornly refused to acknowledge it, but was finally in 1839 obliged to yield. The financial embarrassments of the country, and his relations with the Catholic and Belgian countess Henriette d'Oultremont, made him unpopular. On Oct. 7, 1840, he abdicated in favor of his eldest son William II., and retired to Berlin, where in 1841 he married the countess, his first wife, a daughter of Frederick William II. of Prussia, having died in 1837. He left an immense fortune. His second son, Prince Frederick, born Feb. 28, 1797, became a field marshal, admiral, and colonel general in the Prussian service. He married the princess Louisa, daughter of Frederick William III.

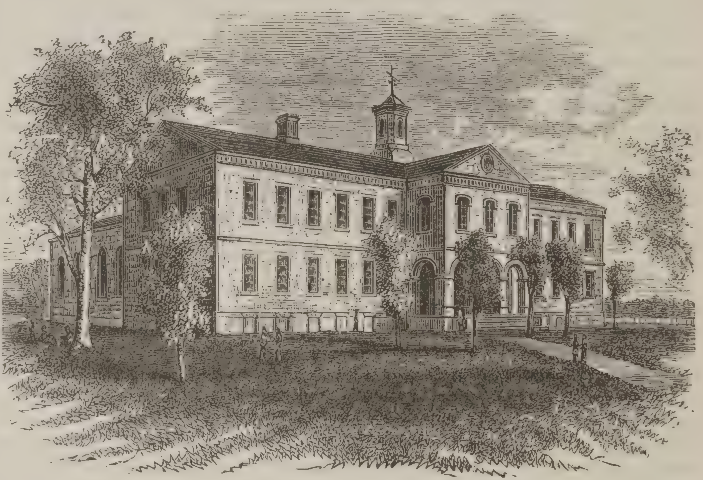
WILLIAM II. (Wilhelm Frederik Georg Lodewijk), king of the Netherlands and grand duke of Luxemburg, born Dec. 6, 1792, died March 17, 1849. He studied in Berlin and Oxford, and in 1811 distinguished himself under Wellington in Spain, and in 1815 at Quatre-Bras, where he commanded, and at Waterloo, where he was wounded. In 1816 he married the Russian grand duchess Anne, a sister of Alexander I. In 1830 he went to Antwerp, and thence to Brussels, to arrange a peaceful settlement with the revolted Belgians, and on Oct. 16 recognized their independence. This act was repudiated by the king, and the prince was recalled and went to England. Subsequently he commanded the Dutch army against the Belgians, and in August, 1832, he was obliged to retreat before the French. He succeeded his father on the throne in 1840. In 1848, after the French revolution, he was constrained to liberalize the constitution still further, and to grant extensive reforms. The queen died on March 1, 1865; she had borne him a daughter, the present grand duchess of Saxe-Weimar-Eisenach, and two sons, his successor William, and Prince Henry, born June 13, 1820, who became lieutenant admiral, and in 1850 governor of Luxemburg.

WILLIAM III. (Wilhelm Alexander Paul Frederik Lodewijk), king of the Netherlands, born Feb. 19, 1817. He was educated in England. In 1849, after his accession to the throne, he faithfully carried out and extended the liberal reforms initiated in 1848, and he reduced his civil list from 1,200,000 to 800,000 florins. The abolition of slavery in the West India colonies was decreed in 1862. In 1866 the Dutch province of Limburg, which since 1815 had formed a part of the Germanic confederation, was fully incorporated with his dominions; and on May 11, 1867, the neutrality of the grand duchy of Luxemburg was recognized, and it was placed under the absolute sovereignty of his dynasty. During the Franco-German war of 1870–'71 the king maintained a strict neutrality. In 1873 he became engaged in warfare with Acheen, in Sumatra, which continued down to 1876. His wife, Sophia, a daughter of King William I. of Würtemberg (born June 17, 1818), is distinguished for scholarly attainments. Their eldest son, William, prince of Orange, was born Sept. 4, 1840.

WILLIAM I. (Friedrich Wilhelm Karl), king of Würtemberg, born at Lüben, Silesia, Sept. 27, 1781, died in the palace of Rosenau, near Stuttgart, June 25, 1864. He was a son of Frederick I., first king of Würtemberg, and of his first wife, the princess Augusta of Brunswick-Wolfenbüttel. He distinguished himself in the Austrian army at Hohenlinden, and lived in retirement at Stuttgart as crown prince from 1806 to 1812. He then took command of the Würtemberg contingent in Russia against the French, but became disabled by illness. His father joined the allies after the battle of Leipsic, and William commanded the 7th corps, including Austrian and Russian regiments, in the campaigns of 1814–'15. On the death of his father, Oct. 30, 1816, he succeeded to the throne. He promulgated a constitution in 1819, and improved the national prosperity. The country was not disturbed by the revolutions of 1848. In 1814 he was divorced from the princess Charlotte of Bavaria, who became the fourth wife of Francis I. of Austria. His second wife, the grand duchess Catharine of Russia, bore him the present queen of Holland and another daughter, and died in 1819. (See Catharine Paulovna.) His third wife, his cousin Pauline of Würtemberg (died 1873), bore two daughters and a son, the present king Charles I.

WILLIAM, duke of Brunswick-Wolfenbüttel. See Brunswick, House of.

WILLIAM I. and **II.,** electors of Hesse-Cassel. See Hesse-Cassel.



William and Mary College.

WILLIAM AND MARY, College of, the oldest seat of learning, except Harvard college, in the United States, near the city of Williamsburg, Va. An effort had been made as early as 1619 to establish a college at Henrico, near the present city of Richmond. An endowment of £1,500 and 15,000 acres of land was procured, but George Thorpe, who came from England to take the preliminary steps, and the settlers who accompanied him, were massacred in 1622, and the project was relinquished. In 1660–'61 the general assembly passed an act providing for the establishment and endowment of a college. In 1693 a charter for a college was obtained from England, through the efforts of the Rev. James Blair and of Nicholson, lieutenant governor of the colony. It took its name from the reigning king and queen, who appropriated lands, funds, a duty on tobacco, and the office of surveyor general of the colony, for its support. Buildings designed by Sir Christopher Wren were soon erected, and Blair was appointed the first president. The first college edifice was destroyed by fire in 1705, and rebuilt shortly after. In 1691 Robert Boyle, the English philosopher, left his personal estate to trustees with the recommendation that it should be expended for "charitable and pious uses." The trustees directed that the annual proceeds, excepting £90 to be given to Harvard college, should be paid to the college of William and Mary for the maintenance and education of Indian students. Prior to the revolution the college received liberal gifts from the general assembly and from individuals for the foundation of scholarships and other purposes. In 1776 it was the wealthiest college in America. The revolution deprived it of its richest chartered and other endowments, including the Boyle benefaction, and reduced its resources to $2,500 in money and the then unproductive land granted by the crown. In 1781 the college was closed, and the buildings were alternately occupied before and during the siege of Yorktown by the French and the American troops. While so held the president's house and a wing of the main building were burned. After the revolution the general assembly gave certain lands to the college, and its organization was changed. The grammar school and the two professorships of divinity and oriental languages were abolished, the Indian school having been previously abandoned. A professorship of law and police, one of anatomy, medicine, and chemistry, and one of modern languages were created. Until 1776 the chancellors of the college were the bishops of London, excepting in 1764, when the office was held by the earl of Hardwicke. George Washington was chancellor from 1788 to 1799, and ex-President John Tyler from 1859 to 1862. During the intervening period the office was not filled. The present chancellor (1876), Hugh Blair Grigsby, was elected in 1871. In 1859 the college building with the old and valuable library was destroyed by fire, but was rebuilt and restored before the end of 1860. In May, 1861, the college exercises were suspended in consequence of the war, and the building was soon after occupied as a barrack and subsequently as a hospital. In September, 1862, it was again burned during the occupation of Williamsburg by the Union forces. Its losses from 1861 to 1865 in buildings and endowment were about $125,000. The college buildings not destroyed and grounds were used by federal troops from May, 1862, till September, 1865, for depots and quarters. In 1869 the main building was substantially restored, the faculty was reorganized, and the college opened to students. Besides a preparatory department, known as the grammar and "Matty" school, founded by Mrs. Mary Whaley in 1742, the college has the following departments: 1, Latin; 2, Greek; 3, mathematics; 4, French; 5, German; 6, natural philosophy and mixed mathematics; 7, chemistry, geology, mineralogy, and physiology; 8, moral and intellectual science and belles-lettres. The course of instruction occupies three to five years. The usual academic degrees are conferred. There have been founded in the college 15 scholarships, which entitle the holders to free tuition. In 1875-'6 the college had 7 instructors and 86 students, of whom 71 were in the collegiate department, and a library of 5,000 volumes. The institution was formerly under Episcopal control, but is now connected with no denomination. Benjamin S. Ewell, LL. D., has been president of the college since 1854; he was also president in 1848. Thomas Jefferson, James Monroe, John Tyler, Chief Justice Marshall, Peyton Randolph, president of the first American congress, John Randolph of Roanoke, and Winfield Scott were graduates of this college. Until 1819 the college by virtue of its charter exercised the duties of the office of surveyor general of Virginia; among the surveyors appointed by it were George Washington and Thomas Jefferson. The parent Phi Beta Kappa society was organized in the college of William and Mary, Dec. 5, 1776. The society was suspended here in 1781, but was revived about 1850.

WILLIAM OF CHAMPEAUX, a French scholar, born at Champeaux, near Melun, in the latter part of the 11th century, died in 1121. He studied in Paris under Anselme of Laon, and became archdeacon of Notre Dame, and a teacher at the school of that cathedral. He was a prominent champion of scholastic realism. Among his pupils was Abélard, who soon eclipsed him to such an extent that William retired and entered a monastery. In 1113 he founded the abbey of St. Victor in a suburb of Paris. He afterward resumed his lectures, but was finally driven from the field by the superior popularity of Abélard, and was appointed archbishop of Châlons. He was involved in the controversy concerning the right of investiture; in 1119 he represented Pope Calixtus II. in the conference at Mousson. Only a few of his treatises are extant.—See *Guillaume de Champeaux et les écoles de Paris au XII^e siècle*, by E. Michaud (Paris, 1867).

WILLIAM THE LION. See SCOTLAND, vol. xiv., p. 704.

WILLIAM OF MALMESBURY. See MALMESBURY, WILLIAM OF.

WILLIAM OF NASSAU, surnamed the Silent, prince of Orange, founder of the independence of the Netherlands, born at the palace of Dillenburg, Nassau, April 16, 1533, assassinated in Delft, July 10, 1584. He was the elder son of Count William the Elder of Nassau and of his second wife Juliane von Stolberg. In 1544 he inherited from his childless cousin René the principality of Orange, in Provence. Although the son of a Protestant, he was brought up at the Catholic court of Queen Mary of Hungary in Brussels, and as a page at that of Charles V., who in 1554 put him in command of troops and employed him in diplomacy. Under Philip II. he paved the way for the treaty of Cateau-Cambrésis (1559), and Henry II. of France detained him and Alva as hostages for its execution. William was of a gay and lively disposition, and was called "the Silent" from the skill with which he concealed his emotions when the French king incautiously revealed to him his plot to exterminate "that accursed vermin" the Protestants. On Philip's departure for Spain he appointed William a member of the council of state which was to assist his half sister Margaret of Parma in the regency of the Netherlands. He opposed the persecution of the Protestants, and finally, in conjunction with Egmont, Horn, and others, brought about the removal of their principal enemy, Cardinal Granvelle (1564). But he was unable to prevent the introduction of the inquisition and the increasing rigor against heretics, though he refused to enforce the king's edicts in the provinces of Holland, Friesland, and Utrecht, of which he was the stadtholder. He disapproved of the rash measures of the *gueux* or "beggars;" but when pacific resistance became evidently unavailing, he proposed to Egmont and Horn, though in vain, forcible measures against the threatened invasion of Spanish troops. In 1567 he pacified Antwerp, where the Calvinists had risen in insurrection, and shortly afterward resigned all his offices and withdrew to Germany, four months before Alva's arrival at Brussels with a Spanish army. Horn and Egmont were seized as traitors; the "blood council" was established, and as William disregarded the summons (January, 1568) to appear before it, he was proscribed, his property was confiscated, and his son the count of Buren was sent to Spain as a hostage. William published an eloquent "Justification against the False Blame of his Calumniators," and began to raise money and troops in concert with the Protestant princes of Germany. The first operations miscarried; his brother Louis was driven back from Friesland, and William with 30,000 men in vain sought to engage Alva in battle in Brabant, and was forced to retire to French Flanders; and in the spring of 1569 he and his brothers Louis and Henry and 1,200 of his soldiers joined the Huguenots under Coligni. He had been approaching the reformed worship step by step, but it was not until four years after this that he first publicly attended communion at a Calvinist meeting. In the autumn of 1569 he returned to Germany, where he issued letters of marque to privateers to prey upon Spanish ships. The capture of Briel in April, 1572, by these "beggars of the sea," was followed by an almost instantaneous rising throughout the provinces. Flushing, Leyden, Haarlem, Dort, and many other cities, as well as the see of Utrecht, recognized William's authority. In July he crossed the Rhine with 24,000 troops, captured Roermond, and occupied other towns, while his brother Louis had in the mean time taken Mons. But the massacre of St. Bartholomew cut him off from all hope of further assistance from France, and once more he was compelled to disband his army. Mons surrendered to the Spaniards, as well as other towns of Brabant and Flanders. In July, 1573, they sacked Haarlem, after a siege of seven months, in which they had lost upward of 10,000 men; but they failed to reduce Alkmaar, and the patriots achieved naval victories and took Middelburg. William in the mean time had collected 6,000 troops at Bommel, and early in 1574 sent orders to Louis to join him. On the way from France the latter was defeated by Ávila, and perished, together with his brother Henry. The siege of Leyden, which had been interrupted by the Spaniards in order to intercept Louis, was now resumed; but William inundated the country by cutting the dikes, and sent Admiral Boisot with a fleet to relieve the place, the Spaniards taking to flight on the approach of the ships. In October, 1574, the estates of Holland placed nearly all authority in the hands of the prince. A conference with the Spanish commissioners at Breda in March, 1575, led to no result. A mutiny among the Spanish soldiers engaged in pillage induced the five provinces which had adhered to Spain to join William and send delegates to the states general at Ghent (October, 1576), at which a league was formed (November) against the common enemy, and freedom of worship was granted to all denominations. In February, 1577, the new Spanish governor, Don John of Austria, issued an edict pretending to grant nearly all the demands of the patriots; but William repelled his attempts, which he had reason to believe were treacherous. His popularity now gave umbrage to a portion of the Roman Catholic nobility, who invited the young archduke Matthias to act as governor general; but his administration was only nominal, while William as lieutenant general was the virtual ruler in conjunction with the states general. Hostilities broke out anew. Don John of Austria overwhelmed the Netherlanders near Gembloux, Jan. 31, 1578, and occupied Louvain and other places. Amsterdam, however, sided with William, and Queen Elizabeth, jealous of the designs of the duke of Anjou, who at the instance of the Catholic nobles had arrived with troops from France, with the double purpose of repelling the Spaniards and supplanting William, subsidized another army of 12,000 men under the count palatine John Casimir; but both expeditions proved abortive. Alexander Farnese, succeeding as governor on the death of Don John, gained over the Walloon provinces, where William had incurred hostility by quelling an outbreak among the Catholics, and in 1579–'80 took possession of Maestricht, Mechlin, and Groningen. Before this, however, the prince, through his brother John, had succeeded in uniting Holland, Zealand, Utrecht, Friesland, Groningen, Overyssel, and Gelderland in a league for mutual defence and assistance. This union, which is generally regarded as the foundation of the Dutch republic, was concluded at Utrecht in January, 1579; and on July 26, 1581, the United Provinces, in an assembly at the Hague, solemnly proclaimed their independence. The sovereignty was offered to the duke of Anjou. Although "Father William," as he was popularly called, had the confidence of the whole people, he contented himself with the governorship of Holland and Zealand, in order not to give umbrage to France, and Anjou assumed the administration of the other provinces. Even after the expulsion of the latter in 1582, William refused the general government. The duke died in France in June, 1584, and before measures could be taken to appoint his successor William of Orange was assassinated. Several attempts upon his life had been made under the influence of the reward of 25,000 crowns and a patent of nobility offered by Philip II. since 1580 for his assassination, and once he was dangerously wounded. The task was at last undertaken by Baltazar Gérard, a Burgundian fanatic, who shot him through the body as he was leaving the dining room. William expired a few minutes afterward in the arms of his wife and sister. The assassin, after undergoing frightful tortures, was beheaded on July 14; but his family was ennobled by Philip and endowed with confiscated estates of the prince. William was about the middle height, and well made, but spare. His complexion was brown, his head was small and symmetrical, and his brow capacious. Next to piety his chief characteristic was firmness. His military genius was early recognized by Charles V., and in political sagacity he had no superior. He left 12 children. By Anne of Egmont he had one son, the count of Buren, and a daughter; by his second wife, Anna of Saxony, two daughters and the celebrated Maurice of Nassau; by Charlotte of Bourbon, six daughters; and by his fourth wife, the widowed Louise de Teligny, daughter of Coligni, one son, Frederick Henry (1584—1647), who succeeded Maurice as stadtholder. A memorial tower in his honor was inaugurated at Dillenburg, June 29, 1875.—See Schiller, *Geschichte des Abfalls der Niederlande;* Gachard, *Correspondance de Guillaume le Taciturne* (5 vols., Brussels, 1847–'65); Motley, "The Rise of the Dutch Republic" (3 vols., London and New York, 1856); Klose, *Wilhelm I. von Oranien* (edited by Wuttke, Leipsic, 1864); and Ernst Herrmann, *Wilhelm von Oranien* (Stuttgart, 1873).

WILLIAM OF WYKEHAM, an English statesman, born at Wickham, Hampshire, in 1324, died at South Waltham, Sept. 24, 1404. He was educated at Winchester, and became secretary to Sir Nicholas Uvedale, governor of Winchester castle. In May, 1356, he was appointed clerk of all the king's works in his manors of Henle and Yeshampsted, and in October "chief keeper and surveyor of the castles of the king at Windsor, Leeds, Dover, and Hadlee." He built a strong castle at Queenborough in the isle of Sheppey. In 1357 the king gave him, though then a layman, the rectory of Pulham in Norfolk. In 1361 he was ordained subdeacon, and in 1362 priest. In 1364 he was made keeper of the privy seal, and in 1366 secretary of state and bishop of Winchester. In September, 1367, he was appointed lord high chancellor of England, which office he resigned March 24, 1371. Charges were made against him in 1376 of misappropriations of money, which were narrowed down to the fact that he had forgiven half of a fine of £80. His property was seized, and he was banished from his see, but was restored after the accession of Richard II. He was again created lord chancellor in 1389, but resigned in 1391. He founded a college at Winchester, and one at Oxford, still called New college, and rebuilt the cathedral at Winchester.

WILLIAMS. I. The extreme N. W. county of Ohio, bordering on Indiana and Michigan, and intersected by the St. Joseph's and Tiffin rivers; area, 600 sq. m.; pop. in 1870, 20,991. The surface is generally undulating and the soil fertile. The Lake Shore and Michigan Southern railroad traverses it. The chief productions in 1870 were 309,099 bushels of wheat, 317,760 of Indian corn, 234,225 of oats, 89,792 of potatoes, 571,752 lbs. of butter, 144,635 of wool, and 30,216 tons of hay. There were 6,761 horses, 6,682 milch cows, 8,257 other cattle, 39,779 sheep, and 17,718 swine; 2 manufactories of agricultural implements, 10 of carriages and wagons, 5 tanneries, 4 currying establishments, 1 flour mill, 17 saw mills, and 4 woollen mills. Capital, Bryan. **II.** A N. W. county of Dakota, bounded N. E. by the Missouri, not included in the census of 1870; area, about 2,500 sq. m. It is intersected by the Big Knife and Little Missouri rivers. The surface is chiefly rolling prairie.

WILLIAMS, Eleazar, an American clergyman, who claimed to be Louis XVII. of France, born at Caughnawaga, N. Y., about 1787, died at Hoganstown, N. Y., Aug. 28, 1858. He was supposed to be the son of Thomas Williams, an Indian chief, and grandson of Eunice, daughter of "the redeemed captive." (See WILLIAMS, JOHN.) He was educated at Longmeadow, Mass., served among the Canadian Indians as a secret agent of the United States in the war of 1812, and was severely wounded at Plattsburgh in 1814. He acted as a lay missionary of the Episcopal church among the Indians for several years, and was ordained in 1826. He translated the Prayer Book into the Mohawk tongue, and published an Indian spelling book, and a work translated into English under the title "Caution against our Common Enemy" (Albany, 1815). About 1842 he began to make known his claim to be the son of Louis XVI. and Marie Antoinette, who he asserted had been successfully abstracted from his revolutionary prison in Paris, and brought to America by an agent of the royal family. The Rev. J. H. Hanson of New York set forth the story in "Putnam's Monthly" in 1853, and afterward in a volume entitled "The Lost Prince" (New York, 1854). Williams's "Life of Te-ho-ra-gwa-ne-gen, alias Thomas Williams, a Chief of the Caughnawaga Tribe of Indians," was privately printed (91 pages, Albany, 1859).

WILLIAMS, Ephraim, an American soldier, born in Newton, Mass., Feb. 24, 1715, killed near Lake George, Sept. 8, 1755. In early life he was a sailor, but afterward became a soldier, and in the Anglo-French war (1740–'48) he was a captain in the provincial service in Canada. In 1750 the government granted him 200 acres of land in the present townships of Adams and Williamstown, on which Fort Massachusetts was built. He was placed in command of that and of all the line of border forts W. of the Connecticut river. In 1755, after the renewal of hostilities between England and

France, he was appointed to the command of a regiment intended to coöperate with Sir William Johnson in the projected campaign against Canada. On his way thither, under a presentiment of his early fall, he devised his landed and other property for the support of a free school among the settlers, from the avails of which, 38 years afterward, Williams college arose. (See WILLIAMS COLLEGE.) On the morning of Sept. 8, 1755, at the head of 1,200 men, he was ordered on a reconnoissance of Dieskau's advancing force, fell into an ambuscade of French and Indians near the head of Lake George, and was shot through the head. The alumni of Williams college in 1854 erected a monument to his memory on the spot where he fell. He was never married.

WILLIAMS, Helen Maria, an English authoress, born in the north of England in 1762, died in Paris in December, 1827. She went to London at the age of 18, and in 1782 published "Edwin and Elfrida," a poem. This was followed by an "Ode on the Peace" (London, 1783), "Peru, a Poem" (1784), "Poem on the Slave Trade" (1788), and "Julia, a Novel" (1790). She settled in Paris in 1790, and published "Letters from France" (2 series, 1790-'92). She advocated the doctrines of the Girondists, and was imprisoned, but released on the death of Robespierre. Her subsequent works are: "Letters containing a Sketch of the Politics of France, and of Scenes in the Prisons of Paris" (4 vols., 1795-'6); "Tour in Switzerland" (2 vols., 1798); "Sketches of Manners and Opinions in the French Republic" (2 vols., 1801); "Correspondence of Louis XVI., with Observations" (3 vols., 1803); "Narrative of Events in France" (1815); and "Letters on Events in France since the Restoration in 1815" (1819). Collective editions of her poems appeared in 1786 and 1823. She wrote the hymn "While thee I seek, protecting Power."

WILLIAMS, Jesse L., an American civil engineer, born in Stokes co., N. C., May 6, 1807. His family removed to Cincinnati in 1814. He was one of the engineers detailed to make the preliminary survey for the Miami and Erie canal, and continued in the engineer corps of Ohio from 1824 to 1832, constructing a portion of the Miami and Erie canal, and also of the Ohio canal. In 1832 he was appointed by the state of Indiana chief engineer of the Wabash and Erie canal, and in 1837 chief engineer of all the internal improvements of the state, embracing about 1,300 m. of canals, railroads, and other works. With the exception of five years, during which the construction of the public works of Indiana was suspended, he has continued to act as chief engineer of the Wabash and Erie canal, though mainly as an advisory officer; but he has been chiefly engaged for the last quarter of a century in the construction and direction of railroads. In 1853 he became chief engineer of the Fort Wayne and Chicago railroad, afterward consolidated with other roads as the Pittsburgh, Fort Wayne, and Chicago railway. He has been elected a director of this company yearly since 1856. In 1864 Mr. Williams was appointed by President Lincoln a director on the part of the government of the Union Pacific railroad, and devoted his attention chiefly to securing the best location through the Rocky mountain region. He was reappointed annually till 1869, when he resigned after the completion of the work and opening of railroad traffic across the continent. In that year he was appointed by the U. S. district court receiver of the Grand Rapids and Indiana railroad; he held that position, and also that of chief engineer, until 1871, having built 200 m. of the work under the orders of the court. In June, 1871, he was appointed chief engineer of the Cincinnati, Richmond, and Fort Wayne railroad, and, having located and built the unfinished portion, 65 m., resigned in 1872.

WILLIAMS, John, an American clergyman, known as "the redeemed captive," born in Roxbury, Mass., Dec. 10, 1644, died in Deerfield, Mass., June 12, 1729. He became pastor of the church in Deerfield in 1688, and in 1704 was captured with his wife and six children by a party of French and Indians, and carried to Canada. On the second day's march Mrs. Williams fell from exhaustion, and was despatched with a tomahawk. He was well treated in captivity, and in 1706 was redeemed, and arrived in Boston Nov. 21, with 57 other captives, among whom were two of his children. His daughter Eunice, 10 years of age, was left behind, and married an Indian. He resumed his pastoral charge at Deerfield, and published a narrative of his captivity, entitled "The Redeemed Captive." (See DEERFIELD.)

WILLIAMS, John, an English missionary, born at Tottenham, near London, June 29, 1796, murdered at Dillon's bay in the island of Erromango, New Hebrides, Nov. 20, 1839. At the age of 20 the London missionary society sent him with his wife to Eimeo, one of the Society islands. Thence, after acquiring a knowledge of the language, they removed, first to Huahine, and finally to Raiatea. He was very successful here for about five years, after which he visited the Hervey islands and founded a mission at Raratonga (1823). He learned the language of the Hervey islands, prepared some books, and translated a portion of the Bible. Having no vessel, he made all the necessary tools, and in 15 weeks built and launched a boat 60 ft. long and 18 ft. wide, the sails being made of native matting, the cordage of the bark of the hibiscus, the oakum of cocoanut husks and banana stumps, and the sheaves of ironwood. In this vessel, within the next four years, he explored almost the whole of the South sea islands. During this time the Samoan mission was established, and the translation of the New Testament into the Raratongan language completed. He visited England in 1834, procured the publication of his Raratongan Testament by the British and foreign Bible society, raised £4,000 for a missionary ship, the Camden, published a "Narrative of Missionary Enterprises in the South Sea Islands, with Remarks upon the Natural History of the Islands, Origin, Languages, Traditions, and Usages of the Inhabitants" (London and New York, 1837), and prepared plans for a theological school at Raratonga and a high school at Tahiti. After his return in 1838, he sailed with one companion for the New Hebrides, to plant a mission, but both were killed by the natives. Of several memoirs of Mr. Williams, the most complete is that by the Rev. Ebenezer Prout (1843).

WILLIAMS, Monier, an English orientalist, born in Bombay, where his father was surveyor general, in 1819. He graduated at Oxford in 1844, and became professor of Sanskrit at Haileybury college, after the abolition of which in 1858 he superintended oriental studies at Cheltenham for two years. In December, 1860, he was elected Boden Sanskrit professor at Oxford. He has published a "Practical Grammar of the Sanskrit Language, arranged with reference to the Classical Languages of Europe" (1846; 2d ed., Oxford, 1857); an English-Sanskrit dictionary (1851); translations of three Sanskrit dramas (1849–'55); "Original Papers illustrating the History of the Application of the Roman Alphabet to the Languages of India" (1859); "Story of Nala," a Sanskrit poem, with vocabulary and Dean Milman's translation (Oxford, 1860); "Indian Epic Poetry" (1863); "A Sanskrit and English Dictionary" (4to, 1872); "Indian Wisdom" (1875); and several works on the Hindostanee language.

WILLIAMS, Roger, the founder of the colony of Rhode Island, born in Wales in 1599 (and not in 1606, as supposed by Dr. Elton), died in Rhode Island in 1683. At an early age he went to London, and attracted by his shorthand notes of sermons, and of speeches in the star chamber, the attention of Sir Edward Coke, who sent him to Sutton's hospital, now the Charterhouse, of which he was elected a scholar, July 25, 1621, and obtained an exhibition July 9, 1624. According to Arnold, the historian of Rhode Island, he was admitted to Pembroke college, Cambridge, Jan. 29, 1623, and matriculated pensioner July 7, 1625. He took the degree of B. A. in January, 1627. There is a tradition that he studied law; but if so, it could have been for a short time only, for it is certain that he had been a clergyman of the church of England when at the close of 1630 he embarked for America. He became a Puritan of the extreme wing, and of that section of the wing whose tendencies toward the views of the Baptists were the immediate occasion of the rapid rise of that denomination in England. Arriving at Boston, Feb. 5, 1631, accompanied by his wife Mary, he soon incurred the hostility of the authorities, chiefly by denying that the magistrates had a right to punish for any but civil offences, and shortly went to Salem to become the assistant of Pastor Skelton. The general court remonstrated against his settlement there, and complained that he had refused "to join with the congregation at Boston, because they would not make a public declaration of their repentance for having communion with the churches of England while they lived there;" and besides this, "had declared his opinion that the magistrate might not punish a breach of the sabbath, nor any other offence as it was a breach of the first table." The objections of Williams to the church of England were, first, that it was composed of pious and worldly men indiscriminately, and second, that it assumed authority over the conscience, and was persecuting. The first of these objections the Puritans of Boston shared theoretically with Williams. But while Williams was practically a consistent and rigid separatist from the beginning, his Puritan brethren were, in his view, chargeable with inconsistency and unseemly concession. The second objection assailed the theocracy which his brethren themselves were rearing on the shores of New England. His ministry at Salem was brief; before the close of summer persecution obliged him to retire to Plymouth, where for two years he was the assistant of the pastor, Ralph Smith. Here too he formed acquaintance with leading chiefs of the Indians, and gained a knowledge of their language. He was invited to return to Salem, and became the assistant and then the successor of Skelton; and his enemies affirm that "in one year's time he filled that place with principles of rigid separation, tending to Anabaptistry." In the autumn of 1635 the general court banished him from the colony, ordering him to depart within six weeks, because he had called in question the authority of magistrates in respect to two things, one relating to the right of the king to appropriate and grant the lands of the Indians without purchase, and the other to the right of the civil power to impose faith and worship. On the first of these points Williams at one time made explanations that were deemed satisfactory; on the other the divergence was hopeless, the ministers who gave their advice at the request of the court declaring that opinions which would not allow the magistrate to intermeddle, even to restrain a church from heresy or apostasy, were not to be endured, and he, on the other hand, maintaining with inflexible rigor the absolute and eternal distinction between the spheres of the civil government and the Christian church. In reply to the charges and in defence of his views Williams published a pamphlet entitled "Mr. Cotton's Letter Examined and Answered." The period allowed him to prepare for his departure had been extended to the coming spring. But his doctrines were spreading, and his purpose of founding a colony, close at hand and embodying his principles, had become known. It was therefore determined to send him to England at once, and a small vessel was despatched to Salem to bring him away. But he was forewarned, and had left before the vessel arrived. In midwinter, abandoning his friends and his family, "sorely tossed for 14 weeks, not knowing what bread or bed did mean," he had gone through the wilderness to the shores of the Narragansett. After purchasing lands of Ousamequin on the eastern shore of the Seekonk river, and planting his corn, he learned that he was within the bounds of Plymouth colony, and set out with five companions on new explorations. In a canoe they went down the stream, turned the extremity of the peninsula, and ascended the river which forms its western boundary, to a spot which tradition has consecrated as their landing. "I having made covenant of peaceable neighborhood with all the sachems and nations round about us," says Williams, "and having, of a sense of God's merciful providence unto me in my distress, called the place Providence, I desired it might be for a shelter for persons distressed for conscience." The fundamental article of government, establishing a pure democracy, with absolute inhibition of control over the consciences of men, which persons admitted to this corporation were required to sign, was in these words: "We, whose names are hereunder, desirous to inhabit in the town of Providence, do promise to subject ourselves, in active or passive obedience, to all such orders or agreements as shall be made for public good of the body, in an orderly way, by the major consent of the present inhabitants, masters of families, incorporated together in a town fellowship, and others whom they shall admit unto the same, only in civil things." The method of planting the first church in Providence, now known as the first Baptist church in that city, answers to views touching that matter which had been set forth by early English Baptists in Holland, fugitives from persecution in England, who had been likewise teachers of Williams in respect to the rights of conscience. These Baptists had instituted baptism among themselves by authorizing certain of their own number to be administrators of the rite. At Providence, in March, 1639, Ezekiel Holliman, a layman, first baptized Williams, and then Williams baptized Holliman, "and some ten more." But Williams seems to have had early doubts of the validity of the proceeding; at any rate, he soon withdrew from his associates in this measure. Various explanations of his withdrawing have been given, and prominent among these the absence of "a visible succession" of authorized administrators of the rite of baptism. The history of Roger Williams, for the succeeding half century, is the history of Providence and of Rhode Island. The colony was for some years a pure democracy, transacting its public business in town meetings; but in 1643 Williams was sent to England to procure a charter. He was successful, and returned in 1644. On his voyage to England he wrote his "Key into the Languages of America," including observations on the manners, habits, laws, and religion of the Indian tribes. He also published there "The Bloudy Tenent of Persecution for Cause of Conscience, discussed in a Conference between Truth and Peace" (new ed., Providence, 1867). On the occurrence of new difficulties in the colony, he was again sent to England in 1651, and was equally successful. While abroad the second time he published "Experiments of Spiritual Life and Health, and their Preservatives," which he says was written "in the thickest of the native Indians of America, in their very wild houses, and by their barbarous fires;" "The Hireling Ministry none of Christ's, or a Discourse touching the Propagating the Gospel of Christ Jesus;" and "The Bloudy Tenent yet more Bloudy by Mr. Cotton's Endeavor to wash it white in the Blood of the Lamb." He also engaged in teaching, and was intimate with Milton. His employments, as well as the scope and character of his learning, are thus indicated in a letter written to Gov. Winthrop of Connecticut soon after his return: "It pleased the Lord to call me for some time, and with some persons, to practise the Hebrew, the Greek, Latin, French, and Dutch. The secretary of the council (Mr. Milton), for my Dutch I read him, read me many more languages. Grammar rules begin to be esteemed a tyranny. I taught two young gentlemen, a parliament man's sons, as we teach our children English, by words, phrases, and constant talk," &c. He returned to Rhode Island in 1654, and in September of the same year was elected president of the colony, an office which he held for two years and a half. He refused to persecute the Quakers, but in 1672 he met three of the most eminent preachers of the sect in public debate at Newport, and afterward published a controversial work entitled "George Fox digged out of his Burrowes." His influence with the Indians enabled him to render signal services to the colonies around him, by averting from them the calamities of savage war; but they refused to admit Rhode Island into the New England league, and even put obstacles in the way of her procuring the means of defence. He was buried in his family burying ground, near the spot where he landed.—Memoirs of the life of Roger Williams have been written by James D. Knowles (Boston, 1833), William Gammell (Boston, 1846), and Romeo Elton (London, 1852). His works, with a volume of letters, have been reprinted as nearly as possible in facsimile by the Narragansett club (6 vols. fol., Providence, 1866–'75). A tract by Williams, recently discovered, is in the John Carter Brown library, Providence.—A monograph was published at Boston in 1876, by H. M. Dexter, D. D., entitled "As to Roger Williams and his 'Banishment' from the Massachusetts Plantation, with a few further words concerning the Baptists, Quakers, and Religious Liberty."

WILLIAMS, Rowland, an English clergyman, born at Halkyn, Flintshire, Aug. 16, 1817, died at Broad Chalk, near Salisbury, Jan. 18, 1870. He graduated at Cambridge in 1840, and became fellow and in 1842 tutor of his college, took orders, and was active in connection with reform at Cambridge. In 1850 he became vice principal and professor of Hebrew in the Welsh theological college of St. David's at Lampeter, and chaplain to the bishop of Llandaff. He was appointed select preacher at Cambridge in 1854. The views on revelation, inspiration, &c., expressed in his sermons, met with much opposition. In 1859 he was appointed vicar of Broad Chalk, and he resided there from 1862. Dr. Williams was one of the authors of the volume of "Essays and Reviews" (1860), and for this was prosecuted in the court of arches and condemned in December, 1862; but the judgment was reversed by the privy council in February, 1864. His other works are: "Rational Godliness, after the Mind of Christ and the Written Voice of the Church" (sermons at Cambridge, 1856); "Christianity and Hinduism Compared" (1856); "Broad Chalk Sermon-Essays, on Nature, Mediation, Atonement, and Absolution" (1867); the "Hebrew Prophets, translated afresh" (2 vols., 1868-'71); "Owen Glendower, a Dramatic Biography, and other Poems" (1870); and "Psalms and Litanies" (4to, 1872), edited by his widow, who has also published his "Life and Letters" (2 vols., 1874).

WILLIAMS, Samuel Wells, an American sinologue, born in Utica, N. Y., Sept. 22, 1812. He graduated in 1832 at the Rensselaer polytechnic institute in Troy, and in 1833 went to Canton as a printer in the mission of the American board of commissioners for foreign missions. He there assisted in editing the "Chinese Repository," a monthly publication begun the year before by Dr. Bridgman. In 1835 he removed to Macao to complete the printing of Medhurst's Hokkeën dictionary. In 1837, while on a voyage to Japan to return home some shipwrecked mariners, he learned their language, and translated the books of Genesis and Matthew into it. He contributed about one third to Dr. Bridgman's "Chinese Chrestomathy," and published "Easy Lessons in Chinese" (8vo, Macao, 1842), "Chinese Commercial Guide" (1844), and "English and Chinese Vocabulary in the Court Dialect" (1844). He visited the United States in 1845, and, to obtain funds for casting a font of Chinese type in Berlin, delivered lectures on China, which were enlarged and published under the title of "The Middle Kingdom" (2 vols., New York, 1848). Soon afterward he received the degree of LL. D. from Union college. In 1848 he returned to Canton, and took charge of the "Chinese Repository," which was discontinued in 1851 with its 20th volume. He accompanied Com. Perry's expedition to Japan in 1853-'4 as interpreter, and in 1855 was appointed secretary and interpreter to the United States legation in Japan, and took charge of it until the arrival of the minister. In 1856 he published a "Tonic Dictionary of the Chinese Language, in the Canton Dialect," and an enlarged edition of the "Commercial Guide," both printed at the mission press in Macao, which was burned with most of the books in December, 1856. In 1858 he assisted Mr. Reed at Tientsin in the negotiations connected with the treaty, and the next year accompanied Mr. Ward to Peking to exchange the ratifications. He revisited the United States in 1860-'61, and on his return to China in 1862 the legation was removed to Peking. The next year he published the fifth edition of the "Commercial Guide," nearly rewritten. In 1874 he published the "Syllabic Dictionary of the Chinese Language" (4to, Shanghai), containing 12,527 characters with their pronunciation as heard at Peking, Canton, Amoy, and Shanghai. This has superseded all other Chinese-English dictionaries. A new edition of the "Tonic Dictionary," revised by Dr. Eitel, has been published by aid of the English authorities (Hong Kong, 1876). Dr. Williams returned to the United States in 1875.

WILLIAMS, William, a signer of the Declaration of Independence, born in Lebanon, Windham co., Conn., April 18, 1731, died there, Aug. 2, 1811. He graduated at Harvard college in 1751. In 1755 he accompanied his relative, Col. Ephraim Williams, in his expedition to Lake George. He was an active member of the council of safety, and in October, 1775, was sent to the continental congress. His property was nearly all expended in the war, and, going from house to house, he obtained many private donations to supply the army. He served nearly 50 years in the state legislature, and took part in the state convention which adopted the federal constitution.

WILLIAMS, William R., an American clergyman, born in New York, Oct. 14, 1804. He graduated at Columbia college in 1822, studied law, practised for a year, and after a visit to Europe entered upon the ministry in the Baptist denomination. He was installed pastor of the Amity street Baptist church, at the time of its formation in 1831, and still retains that office (1876), notwithstanding numerous solicitations to accept more conspicuous positions. He has published two volumes of discourses, "Religious Progress" (Boston, 1850) and "Lectures on the Lord's Prayer" (Boston, 1851); a volume of "Miscellanies" (New York, 1850); and "God's Rescues, or Discourses on Luke xv." (1871).

WILLIAMSBURG, a city of Virginia, and formerly its capital, county seat of James City co., about 50 m. E. S. E. of Richmond, and about the same distance from the Atlantic ocean at the mouth of Chesapeake bay; pop. in 1870, 1,392, of whom 499 were colored. It is on an elevated plateau in the peninsula between the York and James rivers, about 4 m. from the former and 3 m. from the latter. The city consists of three streets nearly parallel with each other. It is the seat of the eastern lunatic asylum of Virginia, established by act of the colonial assembly in 1769 and opened in 1773. This is the oldest institution of the kind in the country. There are two public schools (one male and one female) for each race, and Baptist, Episcopal, and Methodist churches. The Episcopal church edifice dates from 1678, and is still in good repair. The college of William and Mary is adjacent to the city. (See WILLIAM AND MARY, COLLEGE OF.)—In 1699 an act of the general assembly was passed directing the building of the capitol and the city of Williamsburg (so named from William III.) at the "middle plantation," and giving the governor power to incorporate the city. Several parts of this act not having been executed, it was reenacted with additions in 1705. The charter was dated July 28, 1722. The seat of government having been removed from Jamestown in 1700, the general assembly met in the college till the completion of the capitol in 1704, and again from 1748 to 1752, while the capitol, which had been burned, was rebuilt. In 1780, in pursuance of an act of 1779, the seat of government was removed to Richmond. The governor's house or palace, completed after 1710, was burned in 1781. The capitol was again burned soon after 1830. A battle was fought here between a portion of the federal forces under Gen. McClellan and the confederates, May 5, 1862. (See CHICKAHOMINY.)

WILLIAMSBURGH, an E. county of South Carolina, bounded N. E. by Lynch's creek and the Great Pedee river, and S. W. by the Santee, which is here navigable by steamboats, and drained by Black river; area, 1,200 sq. m.; pop. in 1870, 15,489, of whom 10,143 were colored; in 1875, 21,055, of whom 14,234 were colored. The surface is level and diversified by pine forests, and the soil is generally fertile. The Northeastern railroad passes through it. The chief productions in 1870 were 103,487 bushels of Indian corn, 37,011 of sweet potatoes, 249,800 of rice, and 1,791 bales of cotton. There were 764 horses, 3,034 milch cows, 4,884 other cattle, 3,487 sheep, and 10,902 swine; 12 manufactories of tar and turpentine, and 4 saw mills. Capital, Kingstree.

WILLIAMSBURGH, N. Y. See BROOKLYN.

WILLIAMS COLLEGE, an institution of learning at Williamstown, Berkshire co., Mass. It owes its origin to the bequest of Col. Ephraim Williams, whose will (1755) directed "that the remainder of his lands should be sold, at the discretion of his executors, within five years after an established peace; and that the interest of the moneys arising from the sale, and also the interest of his notes and bonds, should be applied to the support of a free school in a township west of Fort Massachusetts; provided that said township fall within the limits of Massachusetts, after running the line between Massachusetts and New York; and provided the said township when incorporated be called Williamstown." The property was sold, and the funds were allowed to accumulate till 1785, when a free school was incorporated by the legislature, nine trustees were appointed, and a lottery was granted for raising funds to erect a school house; about $3,500 was thus obtained, the inhabitants of the town raised about $2,000 more, and in 1790 a brick building (now the West college), 82 ft. long, 42 ft. broad, and four stories high, was completed. The free school was opened Oct. 20, 1791, the Rev. Ebenezer Fitch being the first principal. In 1793 the institution was incorporated as a college under the name of Williams hall; the property vested in the free school was transferred to the college, and a grant of $4,000 was made from the state treasury to purchase a library and apparatus. Mr. Fitch was appointed president, and entered upon his duties in October, 1793. The academy was continued till 1806. The first commencement of the college was held Sept. 2, 1795, when four students graduated. A catalogue was published in 1795, said to have been the first college catalogue ever printed in this country; the college had then 77 students. In 1815 the Rev. Zephaniah Swift Moore became president. Under his administration strong efforts were made to remove the college to Northampton, but the legislature refused its sanction, and in 1821 Dr. Moore resigned, and became president of Amherst college. He was succeeded by the Rev. Edward Dorr Griffin. The Berkshire medical institution was placed under the supervision of the college in 1823, and this relation was maintained till 1832. During President Griffin's administration a large building was erected, containing a chapel and other rooms, which is now known as Griffin hall. In 1836 he resigned, and was succeeded by the Rev. Mark Hopkins, whose reputation as a metaphysician gave a distinctive character to the college. Dr. Hopkins resigned in 1872, and was succeeded by the Hon. Paul Ansel Chadbourne, the present incumbent (1876). In 1836 an astronomical observatory was built, mainly through the instrumentality of Prof. Albert Hopkins, who also erected and presented to the college a magnetic observatory. In 1841 the building known as East college was destroyed by fire, and in 1842 two new buildings, East and South colleges, were erected. In 1846 a library building was erected and named Lawrence hall. Kellogg hall was built in 1847; Jackson hall, for the museum of natural history, in 1855; Alumni hall, containing a new chapel, in 1860; and Goodrich hall, containing the gymnasium and chemical lecture room, in 1865. Near the college buildings is the "Mills park," on the site of and commemorating the prayer meeting of students in which originated American foreign missions. In 1796 the legislature granted the college two townships, which were sold for $10,000, and in 1805 and 1809 two other townships, sold for $10,000 more. About 1820 residents of Berkshire county gave $17,500 to prevent the removal of the college to Northampton. In 1868 the legislature of Massachusetts gave the college $75,000 on condition that $75,000 more should be secured by voluntary donation. The productive funds of the college now exceed $300,000, and its funds for the benefit of needy students amount to $90,000. Prizes amounting to $425 are distributed annually. There are geological, botanical, and zoölogical collections, and the college library contains 17,000 volumes. All the instruction is given directly by full professors. In 1875-'6 there were 11 professors and 170 students. The number of graduates is 1,541.

WILLIAMSON. I. A central county of Texas, drained by San Gabriel river and its tributaries; area, 1,100 sq. m.; pop. in 1870, 6,368, of whom 801 were colored. The surface is level and diversified by prairie and woodland, and the soil is very fertile. The chief productions in 1870 were 12,247 bushels of wheat, 208,574 of Indian corn, 5,086 of sweet potatoes, 22,518 lbs. of wool, and 913 bales of cotton. There were 7,946 horses, 3,481 milch cows, 29,221 other cattle, 12,062 sheep, and 7,850 swine. Capital, Georgetown. **II.** A central county of Tennessee, drained by the head streams of the Harpeth river; area, 476 sq. m.; pop. in 1870, 25,328, of whom 11,411 were colored. The surface is generally hilly and the soil highly fertile. Iron ore and some other minerals are found. The county is intersected by the Louisville, Nashville, and Great Southern railroad. The chief productions in 1870 were 227,294 bushels of wheat, 1,010,443 of Indian corn, 99,933 of oats, 24,440 of Irish and 20,555 of sweet potatoes, 187,008 lbs. of butter, 29,944 of wool, 80,415 of tobacco, 3,815 bales of cotton, and 2,680 tons of hay. There were 7,194 horses, 3,121 mules and asses, 5,060 milch cows, 6,988 other cattle, 15,226 sheep, and 41,703 swine; 8 manufactories of carriages and wagons, 2 flour mills, and 7 saw mills. Capital, Franklin. **III.** A S. county of Illinois, drained by Big Muddy river and other streams; area, 432 sq. m.; pop. in 1870, 17,329. The surface is diversified by prairie and woodland, and the soil is fertile. Bituminous coal is abundant. The Carbondale and Shawneetown railroad terminates at the county seat. The chief productions in 1870 were 170,963 bushels of wheat, 655,710 of Indian corn, 180,986 of oats, 38,901 of Irish and 24,900 of sweet potatoes, 16,728 lbs. of butter, 43,908 of wool, 1,152,589 of tobacco, and 3,059 tons of hay. There were 5,129 horses, 1,667 mules and asses, 4,016 milch cows, 6,354 other cattle, 20,971 sheep, and 30,281 swine; 5 manufactories of carriages and wagons, 2 flour mills, 1 woollen mill, and 3 saw mills. Capital, Marion.

WILLIAMSON, Hugh, an American physician, born in West Nottingham, Pa., Dec. 5, 1735, died in New York, May 22, 1819. He graduated at the university of Pennsylvania in 1757, was professor of mathematics there from 1760 to 1764, and afterward studied medicine at Edinburgh and Utrecht, and practised in Philadelphia. He went to London in 1773, and, being called before the privy council, warned it of the impolicy of its measures. He returned in 1776, after a time settled at Edenton, N. C., was a surgeon in the army, was several times elected to congress, and was a member of the convention that framed the federal constitution. In 1793 he removed to New York. He published "A Discourse on the Benefits of Civil History" (New York, 1810); "Observations on the Climate of America" (1811); and "History of North Carolina" (2 vols., 1812).

WILLIAMSPORT, a city and the county seat of Lycoming co., Pennsylvania, on the N. bank of the West branch of the Susquehanna river, between Lycoming and Loyalsock creeks, 70 m. N. by W. of Harrisburg; pop. in 1870, 16,030. It is surrounded by high hills and much fine scenery. The streets are wide and straight, lighted with gas, and traversed by horse cars. The business quarter is substantially built, and numerous handsome residences and gardens make the place very attractive. It owes its prosperity to the lumber business. The Susquehanna boom extends from 3 to 4 m. up the river, and in spring is filled with pine and hemlock logs. The annual shipments of lumber average about 250,000,000 ft. The West Branch canal passes through the city, and the Philadelphia and Erie, the Northern Central, and the Catawissa and Williamsport railroads meet here. There are numerous saw mills, several planing mills, machine shops, and founderies, and manufactories of saws, files, carriages, locks, soap and candles, ale and beer, shingle machines, &c. The city contains six national banks, with an aggregate capital of $784,950; a savings bank; a home for the friendless; nine public school houses, with graded schools, including a high school, attended by about 3,500 pupils; and two academies. Two daily, one semi-weekly (German), and six weekly (two German) newspapers are published. There are 32 churches, viz.: 5 Baptist, 1 Congregational, 3 Episcopal, 3 Evangelical, 1 Jewish, 4 Lutheran, 8 Methodist, 4 Presbyterian, 1 Reformed, and 2 Roman Catholic. Sessions of the United States courts for the W. district of Pennsylvania are held here twice a year.—Williamsport was settled in 1797, incorporated as a borough in 1806, and received a city charter in 1866.

WILLIAMSTOWN, a town of Berkshire co., Massachusetts, on the Troy and Boston railroad, 25 m. (direct) E. of Troy, N. Y.; pop. in 1860, 2,611; in 1870, 3,559; in 1875, 3,683. It occupies the N. W. corner of the state, bordering on New York and Vermont. It abounds in fine scenery, and is becoming a summer resort. Print cloths are manufactured, two factories, with 18,447 spindles, being employed. The town contains 13 public schools, a preparatory school for boys, a town library, and Baptist, Congregational (3), Episcopal, Methodist, and Roman Catholic churches. It is the seat of Williams college. (See WILLIAMS COLLEGE.)

WILLIBROD. See WILBRORD.

WILLIS, Francis, an English clergyman and physician, born in Lincolnshire in 1718, died at Greatford, Lincolnshire, Dec. 5, 1807. He was educated at Oxford, took orders in 1740, and was appointed to the living of Greatford, where he opened an asylum for the insane, over whom he is said to have possessed great power of fascination. In 1759 he obtained the degree of M. D. from Oxford. He had charge of George III. during his earlier attacks of insanity (as his son Dr. Robert Darling Willis had during his later ones), and received for his services a pension of £1,500 for 21 years. For curing the queen of Portugal of a similar disorder he received £20,000.

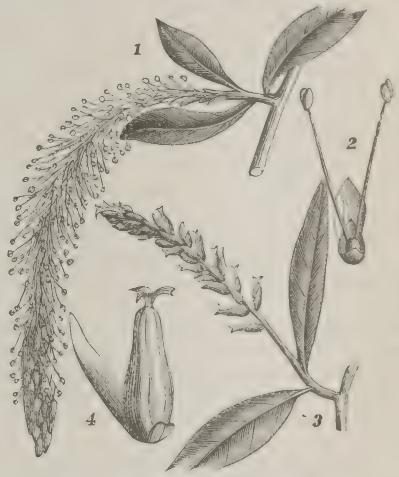
WILLIS. I. Nathaniel, an American journalist, born in Boston, June 6, 1780, died there, May 26, 1870. In 1803 he established the "Eastern Argus" in Portland, Me., and in 1816 the "Boston Recorder," the first religious newspaper, the plan of which he had laid before several clergymen as early as 1808, and in 1810 before the Maine missionary society at Bath. Of this journal he was proprietor till 1843. He also founded in 1827 the "Youth's Companion," a weekly paper for the young, the first of that class of periodicals, which he edited and published till 1857. **II. Nathaniel Parker**, an American author, son of the preceding, born in Portland, Me., Jan. 20, 1806, died at Idlewild, near Newburgh, N. Y., Jan. 21, 1867. He graduated at Yale college in 1827. While in college he published, under the signature of "Roy," a series of "Scripture Sketches" in verse and other poems, and immediately after graduating was employed by S. G. Goodrich (Peter Parley) to edit the "Legendary" and the "Token." In 1828 he established the "American Monthly Magazine," which after two years was merged in the "New York Mirror," previously established by George P. Morris, of which he became associate editor. Soon after he visited Europe, and wrote letters to that journal entitled "Pencillings by the Way" (collected, 3 vols., London, 1835). In Paris he was made an attaché of the American minister. After travelling through southern Europe, Turkey, and parts of Asia Minor, he returned to England, and in 1835 married a daughter of Gen. Stace, commandant of the Woolwich arsenal. He also published there "Melanie and other Poems" (edited by Barry Cornwall, 1835), and "Inklings of Adventure" (3 vols., 1836), a series of tales and sketches which originally appeared in the "New Monthly Magazine" under the pseudonyme "Philip Slingsby." In 1837 he returned home, and for two years lived in retirement on a small estate which he named Glenmary, on the Susquehanna, near Owego, N. Y. In 1839 he became one of the editors of the "Corsair," a short-lived literary gazette published in New York, and later in the same year revisited England, where appeared two dramas published together under the title "Two Ways of Dying for a Husband: 1. Dying to Keep Him, or Tortesa the Usurer; 2. Dying to Lose Him, or Bianca Visconti" (1839); "Loiterings of Travel" (3 vols., 1840); and "Letters from under a Bridge, and Poems" (1840). He also issued an illustrated edition of his poems. Returning to New York, he established in 1844, in connection with George P. Morris, a daily newspaper called the "Evening Mirror;" but the death of his wife and his own failing health led him to return to Europe. During this visit he published "Dashes at Life with a Free Pencil" (3 vols., 1845), a collection of magazine articles. On returning to New York in 1846, he married a daughter of the Hon. Joseph Grinnell of New Bedford, and settled at a seat on the Hudson which he named Idlewild. In the same year he published a complete edition of his works in one large volume, and with Mr. Morris established the "Home Journal," a weekly, to which he contributed till his death. His other works include "Rural Letters and other Records of Thought and Leisure" (1849); "People I have Met" (1850); "Life Here and There" (1850); "Hurrygraphs" (1851); "Fun Jottings, or Laughs I have taken a Pen to" (1853); "A Health Trip to the Tropics" (1853); "A Summer Cruise in the Mediterranean in a United States Frigate" (1853); "Famous Persons and Places" (1854); "Out-Doors at Idlewild" (1854); "The Rag Bag" (1855); "Paul Fane, or Parts of a Life else Untold" (1856); and "The Convalescent" (1860).

WILLIS, Thomas, an English physician, born at Great Bedwin, Wiltshire, Jan. 27, 1621, died in London, Nov. 11, 1675. He graduated at Oxford in 1639, fought in defence of Charles I., studied medicine, and at the restoration was appointed Sedleian professor of natural philosophy in the university of Oxford. In his "Anatomy of the Brain" (4to, 1644) he first showed that the brain is a congeries of organs, and the seat of moral and intellectual action. The name "circle of Willis" has been retained for the circular arterial inosculation at the base of the brain by which the vertebral arteries behind and the internal carotids in front are united with each other, while those on the right side at the same time communicate with those on the left by similar free inosculation. He was appointed physician in ordinary to the king in 1666. He was one of the founders of the royal society. He also published a treatise on the "Pathology of the Brain and Nervous System" (1667), in which he gave the true explanation of the phenomena in the spasmodic diseases hysteria, chorea, &c.

WILLISTON, Samuel, an American philanthropist, born in Easthampton, Mass., June 17, 1795, died in 1874. He acquired a large fortune in the manufacture of buttons. In 1841 he established in his native town Williston seminary, to which he gave about $270,000, and bequeathed about $600,000 more. He endowed two professorships at Amherst in 1845–'7, and gave that college in all about $150,000. He thrice erected a church at Easthampton, which was thrice burned. His gifts and bequests amounted to more than $1,500,000.

WILLOUGHBY, Sir **Hugh,** an English explorer, born at Risby, Derbyshire, perished either at sea or on some portion of the arctic coast in the north of Finmark about January, 1554. In 1553 the merchants of London fitted out an exploring expedition, and invested him with the authority of admiral of their fleet of three vessels: the Bona Speranza, of 120 tons, Sir Hugh's ship; the Edward Bonaventura, of 160 tons; and the Bona Confidentia, of 90 tons; the whole carrying 136 persons, of whom 18 were merchants concerned in the venture. It was destined "for the discovery of regions, dominions, islands, and places unknown," but forming a part of the country claimed under Sebastian Cabot's discoveries. It sailed from Deptford May 10, 1553, but on July 30 the vessels were scattered by a storm, and they were detained on the coast for two months. The Bona Speranza and Bona Confidentia put into the harbor of Arzina in Lapland, where the crews and passengers all perished. The Bonaventura was wrecked, and a few of the seamen reached Archangel. Repeated expeditions searched for these ships, but brought meagre information of them, though a will of Gabriel Willoughby, a kinsman of Sir Hugh, attested by the latter as witness, was obtained from the Russians some years later, dated in January, 1554.

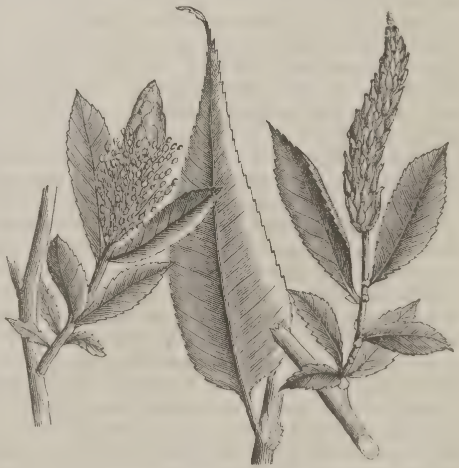
WILLOW (supposed to be from A. S. *wilig*, pliancy), the name of shrubs or trees of the genus *salix* (the ancient Latin name). Some willows are in England, and to some extent in our nurseries, called sallows (A. S. *sal* or *sæl*, a strap or tie), in French *saule.* This genus and the poplar (*populus*) make up the family *salicaceæ.* The willows vary in size from alpine species an inch or two high to trees of 50 to 80 ft.; they have generally lithe and slender branches; the leaves, usually long and pointed, are alternate, entire or serrate, with deciduous or persistent and often very conspicuous stipules. The flowers are diœcious, in cylindrical, often silky catkins, appearing before or with the leaves; the scales in both kinds of catkins entire; the sterile flowers have two (rarely three to ten) stamens, with one or two small glands at the base; the pistillate flowers have a single sessile or stalked ovary with a gland at its base; stigmas two, often two-lobed; the one-celled ovary ripening into a conical capsule opening by two valves, and liberating several small, silky-tufted seeds.—The willows are widely distributed from the tropics to the arctic regions, ascending mountains to the limit of vegetation, but in low countries chiefly inhabiting wet localities; they are not found in Australia. The number of species is very doubtful, as few genera present so many difficulties to the botanist; the leaves vary in the same species, and often do not appear until after the flowers, and the staminate and pistillate flowers must be gathered before the leaves appear or when these are quite young, and later specimens must be taken from the same plants with mature leaves and fruit; hence in most cases four specimens are required to represent a species, and as a consequence herbaria usually present a confused lot of incomplete specimens; besides these difficulties, the same species grown upon mountains appears different in the lowlands, and it is said that the species hybridize in the wild state to produce intermediate forms. Only the few important species will be mentioned here, and these are sufficiently well defined; the majority are of interest only to the botanist. Even in the limited territory of Great Britain, there is much disagreement as to the number of species, some botanists making 58, while others reduce the number to 15. Prof. Andersson of Stockholm, Sweden, who has given special attention to the willows, described the North American species in a memoir published in the "Proceedings of the American Academy of Arts and Sciences" (1858); he enumerates 59 species, of which only 10 are peculiar to America; 12 are identical with European species, and a part of them introduced; the remainder are nearly identical with or analogous to those of Europe or of European types. The trees have a remarkably rapid growth; some species are very ornamental, while others are planted for their usefulness as wind-breaks and to resist the encroachments of streams; the roots are large and abundant, and in moist places run to a great distance and bind the soil with their numerous fibres; they grow readily from cuttings, which is the usual method of propagation, except for some ornamental varieties,



Willow—Staminate and Pistillate Flowers.
1. Staminate Catkin. 2. Staminate Flower. 3. Pistillate Catkin. 4. Pistillate Flower.

which are grafted. The bark, smooth and often shining, is tough, and is used for matting, cordage, fishing nets, and similar uses in northern countries; and in times of scarcity in Norway and Sweden it is kiln-dried and ground to mix with oatmeal. The bark in all is bitter, from the principle salicine, which is more abundant in some species than in others; this is a white crystallizable neutral substance, with the tonic properties of the bark; it has been used as a substitute for quinine, and also to adulterate that product. The bark is also astringent, and contains so large an amount of tannin that in northern Europe it is deemed nearly as valuable as oak bark in preparing leather. The wood of the willows is light but firm, and where it is abundant is employed for many of the purposes for which pine is used; it serves for house timber, and small sailing vessels are built of it; it is very durable when kept constantly under water and when quite dry, but soon decays if exposed to the weather; common casks, farm implements, lasts, ladders, and turned wares are among the articles made from it. It makes a quick clear fire, and burns readily when green; its charcoal is much esteemed for gunpowder, and also serves to make sketching crayons. In some countries cattle are fed upon the leaves, which are collected and stored for winter forage. The character of the twigs or slender branches of several species especially adapts them to basket making. (See Osier.)—The most important species is the white willow (*salix alba*), common throughout Europe and western Asia, and extensively naturalized in this country. It forms a handsome tree 50 to 80 ft. high; the young shoots are green; the narrowly lanceolate, pointed, serrate leaves, when young, are silky on both sides, smooth above when old, but always dull green; the flowers are borne at the ends of lateral leafy shoots, appearing in May and June, the stamens always two to each scale. This is a most valuable tree for prairie countries, either for itself, or as rapidly furnishing protection for other trees, and immense numbers are planted annually. When the trees are set thickly, they rapidly produce long straight poles for fences and furnish a supply of fuel. It is sometimes planted very closely to form a live fence or tall hedge, but there is much doubt as to its permanence when thus treated. In Maryland and Delaware it is planted to furnish charcoal to the powder mills. The golden willow or yellow osier, formerly regarded as a distinct species, is a variety of the white (var. *vitellina*), with its young shoots bright yellow, rather shorter and broader leaves, and a more spreading habit; this, in the older states, is very generally introduced and much more common than the type; in Europe it is often cultivated as an osier. Another variety of the white is the blue willow (var. *cærulea*), which has its leaves less downy beneath and of a more bluish green; this is considered a much more rapid grower than the white, and in England it is asserted that it will produce a greater amount of timber than can be obtained in the same period from any other tree.—The brittle or crack willow (*S. fragilis*), so called because the young shoots readily break away from the branches, is much less common in this country than the preceding, though considerably planted in the older states; it grows larger and more rapidly than the white, from which it differs principally in having greener and smooth leaves, the teeth upon which are inflexed, and in its larger and looser catkins. In England this is regarded as the most valuable willow for timber, its wood being harder than that of any other, the heart wood of a deep reddish color. The varnished willow (var. *decipiens*), the Bedford willow (var. *Russelliana*), and the green willow (var. *viridis*), formerly classed as species under the names here given for the varieties, are forms of this, and are sometimes cultivated as osiers.

Weeping Willow (Salix Babylonica).



Glossy Willow (Salix lucida).

Herb-like Willow (Salix herbacea).

—The weeping willow (*S. Babylonica*), a native of Asia and northern Africa, is supposed to have been introduced into Europe by Tournefort from the Levant in 1702. Being so frequently planted, its long, slender, pendulous branches and linear-lanceolate leaves are very familiar; only the pistillate sex has been introduced into this country. It grows to a large size, is one of the first trees to leaf out in spring, and holds its foliage until the killing frosts. A curious variety (var. *annularis*) has its leaves coiled into a ring, and is called the ring-leaved or hoop willow. The American weeping willow of the nurseries is a partly pendulous form of the European purple willow (*S. purpurea*), and needs much training to keep it in shape. The Kilmarnock weeping willow is a remarkable variety of the European sallow willow (*S. caprea*), the branches of which are sharply reflexed; when grafted 7 or 8 ft. high on other species, it makes an interesting lawn tree.—The most beautiful of the genus is the native shining willow (*S. lucida*), which grows from Pennsylvania northward, and in British America from ocean to ocean; in cultivation it grows to 15 or 20 ft. high, but in the wild state it flowers when only 3 ft., forming a handsome head with dark green branches; the leaves, 3 to 5 in. long, have a long tapering point and are smooth and shining on both sides; the flowers appear on short leafy branches. This is becoming deservedly popular as an ornamental tree, and is so much like the bay willow (*S. pentandra*) of Europe, that some botanists consider them the same. There are several prostrate alpine species, some of which are found on our higher mountains; among them is the interesting herb-like willow (*S. herbacea*), which, in marked contrast with the lofty white and weeping species, rarely reaches 2 in. in height, and bears disproportionately large catkins.

WILLUGHBY, Francis, an English naturalist, born at Wollaton, Nottinghamshire, in 1635, died there, July 3, 1672. He graduated at Cambridge in 1656, and while there was the pupil of John Ray, with whom he afterward travelled through France, Spain, Italy, Germany, and the Low Countries, Ray examining the plants and Willughby the animals of each country. Ray published Willughby's "Ornithology" (fol., 1676) and "Ichthyology" (1686). They are of great value even yet for their accurate descriptions of species.

WILMINGTON, a city and port of entry of New Castle co., Delaware, the chief city of the state, at the confluence of Christiana and Brandywine creeks, 28 m. S. W. of Philadelphia; pop. in 1850, 13,979; in 1860, 21,258; in 1870, 30,841, of whom 5,152 were foreigners and 3,211 colored; in 1875, 39,750, or, including suburbs, about 42,500. The city is built principally upon the hilly ground between the creeks, which rises gradually from them on three sides to a height near the N. W. boundary of 243 ft. above tide water. The junction of the Christiana and Brandywine is about one mile above their united entrance into the Delaware, and half a mile below the built portion of the city, but within its boundaries, which now extend to the shore of the Delaware as well as beyond the other streams. The city is regularly laid out, with streets at right angles, the principal ones paved with stone, and all lined with brick sidewalks. The

The Old Swedes Church.

buildings are uniformly of brick, made of excellent clay underlying and surrounding the city. The public buildings are the city hall, the county almshouse, the custom house and post office, the Wilmington institute and public library, and the opera house. There are several handsome church edifices, including the Central and West Presbyterian and Grace (Methodist) churches, and the church of the Sacred Heart (German Catholic). The old Swedes church, a stone edifice erected in 1698, is still in a fair state of preservation. The city is supplied with excellent water from the Brandywine. The streets are lighted with gas and traversed by horse cars. In a distance of 4 m. terminating within the limits of the city the Brandywine falls 120 ft., affording great water power. On its banks are extensive flouring mills, celebrated powder mills, and numerous and large cotton, bleaching and dyeing, paper, and other mills. But the city is especially noted for the extent and variety of its manufactures by steam power, including carriages, morocco, cars, cotton goods, iron castings, iron steamships, plate, bar, and sheet iron, engines and boilers, a great variety of other articles of iron and steel, phosphates and sulphuric acid, wooden vessels, boots and shoes, leather, &c., and vulcanized fibre, the result of a chemical process for utilizing paper for various purposes in which leather, wood, and iron have heretofore been employed. Wilmington was the first place in the country where iron ship building was carried on, and it is still a leading seat of that industry. In the manufacture of passenger cars Wilmington ranks first in the country, while it is among the first in its annual production of morocco and carriages. The total amount of capital invested in manufactures in 1873 was $12,725,000; value of annual products, $21,150,000; number of hands employed, 7,000 to 8,000. The statistics of the principal branches were as follows:

BRANCHES.	Capital.	Value of products.
Powder and chemicals	$1,400,000.	$1,200,000
Paper	1,100,000	1,200,000
Cotton goods	1,000,000	1,100,000
Railroad cars	800,000	2,000,000
Iron ship building	750,000	1,200,000
Machine work	1,300,000	2,200,000
Morocco	750,000	1,750,000
Carriages	800,000	1,400,000
Flour, corn meal, &c	400,000	1,200,000
Leather, other than morocco	250,000	300,000
Iron	750,000	1,300,000
Foundery work and car wheels	400,000	2,000,000
Tobacco, snuff, spices, parlor matches	475,000	700,000
Sash, blinds, &c	150,000	250,000
Bricks	150,000	200,000
Boots and shoes	100,000	150,000
Fertilizers	250,000	500,000

Wilmington lies directly in the great thoroughfare of travel and traffic between the north and south, of which the Philadelphia, Wilmington, and Baltimore railroad forms so important a part. Railroad facilities are also afforded by the Delaware, the Wilmington and Reading, and the Wilmington and Western lines. Steamers run to Philadelphia and New York. The Christiana admits vessels drawing 18 ft. and the Brandywine those drawing 7 ft. to the head of tide. There is considerable trade by sailing vessels between the city and ports on the Atlantic coast and in the West Indies. There are four national banks and one state bank, with an aggregate capital of $1,250,000; two savings banks, deposits $750,000; three fire insurance companies; and 23 building and loan associations, which have greatly aided the growth of the city. The total assessed value of real estate in 1873 was $23,000,000, and the estimated value of personal property $18,500,000. The city has a police force, and a fire department provided with seven steam engines and improved apparatus. There are five charitable institutions. The city contains 17 public schools, including a high school, with nearly 6,000 pupils, and 16 private schools and academies. The Delaware historical society, the mechanics' institute, and the Wilmington institute have libraries, the last containing 11,500 volumes. Five daily and eight weekly newspapers are published. There are 45 churches, viz.: 5 Baptist, 8 Episcopal, 2 Friends', 1 Lutheran, 15 Methodist (7 African), 7 Presbyterian, 5 Roman Catholic, 1 Swedenborgian, and 1 Unitarian.—Wilmington was founded in 1732, when the site was partially laid out and the first house was erected. It was incorporated as a borough in 1740, and as a city in 1832. On Christiana creek, about half a mile from the original town, but within the present city limits, is a small rocky promontory upon which the first Swedish colony in America landed in April, 1638, and around which was planted the first permanent European settlement in the valley of the Delaware.

WILMINGTON, the principal seaport and largest city of North Carolina, county seat of New Hanover co., on the E. bank of the N. E. branch of Cape Fear river, at its junction with the estuary of that river, 20 m. from the sea and 110 m. S. S. E. of Raleigh; lat. 34° 11′ N., lon. 78° 10′ W.; pop. in 1850, 7,264; in 1860, 9,552; in 1870, 13,446, of whom 7,920 were colored; in 1876, locally estimated at from 17,000 to 18,000. It has a court house, city hall, and theatre. Street cars run through the principal streets to the railroad depots and to Oakdale cemetery. The Sound, a place of summer residence, is 7 m. distant. The city is the terminus of three railroads, viz.: the Wilmington and Weldon, the Wilmington, Columbia, and Augusta, and the Carolina Central. The last runs through the S. portion of the state to its W. border; the others connect with other lines running N. and S. Wilmington has an extensive commerce both coastwise and foreign; the latter has largely increased within the last three years. There are regular lines of steamers to Baltimore, Philadelphia, and New York. Vessels drawing 16 ft. can load at the wharves; when the improvements on the bar now in progress are completed, the depth of water will be materially increased. The principal articles of shipment are lumber, turpentine, rosin, tar, pitch, spirits of turpentine, shingles, and cotton. Wilmington has long been the leading market for naval stores in the world. The value of imports from foreign countries for the year ending June 30, 1875, was $151,925; of exports to foreign ports, $3,015,069. The chief items of export were 3,553,606 gallons of spirits of turpentine, valued at $1,201,888; 14,623 bales of cotton, $938,501; 289,340 barrels of rosin and turpentine and 14,142 of tar and pitch, $710,108; and 6,809,000 ft. of boards, &c., and 2,960,000 shingles, $149,107. The number of entrances was 171, tonnage 46,074; clearances, 235, tonnage 61,958; entrances in the coastwise trade, 277, tonnage 149,475; clearances, 210, tonnage 129,249; belonging to the port, 66 vessels, tonnage 5,597. The shipments to domestic and foreign ports in 1875 amounted to about $10,000,000. There are three banks, marine railways, a cotton compress company, a cotton factory, five saw and planing mills, a rice mill, four flour and grist mills, nine turpentine distillers (running 29 stills), an iron foundery, and a sash and blind factory. The principal charitable institutions are a seamen's home and a marine hospital. There are 12 academies and schools, a library, five newspapers (three daily), and 22 churches.—Wilmington was laid out in 1733, under the name of Newton. The name was changed in 1739. It was incorporated as a borough in 1760 and as a city in 1866. During the civil war, and especially in 1864, it was the principal confederate port accessible to blockade runners. Although 50 blockading vessels were cruising off the adjacent coast, 203 vessels succeeded in entering the port, and 194 in leaving it, during the 15 months ending Dec. 31, 1864, while about 60 were captured or run ashore. New inlet, the principal entrance to Cape Fear river, was protected by Fort Fisher, an earthwork of great strength, and beyond it the narrow and intricate channel was filled with torpedoes and commanded by forts and batteries. In December, 1864, a combined naval and military expedition under Admiral Porter and Gen. Butler was sent against Fort Fisher. After an unsuccessful attempt to injure the fort by the explosion of several hundred tons of powder from a vessel, followed by a severe bombardment, the troops returned to Hampton roads. The fleet remained behind to coöperate with a new and stronger military expedition. This, numbering about 8,000 men, was committed to Gen. Terry. It reached its destination Jan. 12, 1865, and on the next day began to debark under cover of a heavy fire from the fleet. The bombardment was kept up until the afternoon of the 15th, when the fort was assaulted and taken. Of the garrison, 2,300 strong, 2,083 surrendered, the remainder being killed or wounded. The Union loss was nearly 1,000; besides which, on the next day, the magazine of the fort was accidentally blown up and more than 200 men were killed or wounded. Wilmington was now useless as a port for blockade runners, but was still held by a confederate force. Gen. Schofield had in the mean time been sent to North Carolina with 23,000 men. Moving up the bank of the river, he turned the fortifications commanding the city, which was abandoned Feb. 21. The Union loss in this operation was about 200, that of the confederates about 1,000, including prisoners.

WILMOT, John. See ROCHESTER, earl of.

WILNA, or **Vilna** (Pol. *Wilno*). **I.** A W. government of Russia, in Lithuania, bordering on Kovno, Courland, Vitebsk, Minsk, Grodno, and Suwalki; area, 16,411 sq. m.; pop. in 1876, 1,087,705, comprising chiefly Lithuanians, who form the bulk of the peasantry, Jews, Poles (greatly reduced in numbers since the insurrection of 1863), and Russians. The surface is generally flat. The most important rivers are the Niemen and its tributary the Viliya or Wilia. Iron ore is the most valuable mineral production. The climate is severe in winter, but in summer it is warm and damp. Forests, moors, and morasses abound. The exports include grain, hemp, flax, timber, honey, wax, and spirits. **II.** A city, capital of the government, beautifully situated in a hilly region on the Viliya, 400 m. S. W. of St. Petersburg; pop. in 1867, 79,265, comprising over 25,000 Jews. It has two suburbs, and is the seat of a Greek and a Catholic bishop. The Catholic cathedral has a marble chapel and the silver coffin of St. Casimir; there are about 22 other Catholic churches, including the immense St. John's and the magnificent St. Peter's, about a dozen Greek churches, places of worship for Reformed and Lutherans, several synagogues, a mosque, and many convents. There are two gymnasiums, religious seminaries, a museum with a public library, and a theatre. It carries on a considerable trade, mainly with the Russian and Prussian ports on the Baltic, with which it is connected by rail, but its manufactures are insignificant. The university, founded in 1570, was closed in 1832. Wilna dates from the 13th century, and was the capital of Lithuania. In the 16th century it had a population estimated at 1,000,000, but in 1835 it had declined to 35,000; lately it has rapidly increased, and railway traffic has produced additional commercial activity.

WILSON, the name of four counties in the United States. **I.** A N. E. county of North Carolina, drained by the Mackason river; area, about 550 sq. m.; pop. in 1870, 12,258, of whom 5,073 were colored. The surface is undulating or hilly, and the soil fertile. It is intersected by the Wilmington and Weldon railroad. The chief productions in 1870 were 8,690 bushels of wheat, 212,770 of Indian corn, 10,588 of oats, 12,288 of peas and beans, 36,352 of sweet potatoes, 5,225 bales of cotton, and 1,854 tons of hay. There were 481 horses, 1,141 milch cows, 2,561 other cattle, 2,176 sheep, and 9,403 swine; 2 manufactories of agricultural implements, 9 of carriages and wagons, 1 of pumps, 1 flour mill, and 2 saw mills. Capital, Wilson. **II.** A S. county of Texas, drained by San Antonio river and Cibolo creek; area, 670 sq. m.; pop. in 1870, 2,556, of whom 463 were colored. The surface is hilly and the soil productive. There is little timber except along the streams. The chief productions in 1870 were 52,712 bushels of Indian corn, 12,116 of sweet potatoes, 34,410 lbs. of butter, and 358 bales of cotton. There were 5,481 horses, 2,619 milch cows, 17,829 other cattle, and 7,771 swine. Capital, Floresville. **III.** A N. central county of Tennessee, bounded N. by the Cumberland river; area, about 500 sq. m.; pop. in 1870, 25,881, of whom 7,331 were colored. The surface is moderately hilly and the soil extremely fertile. The Tennessee and Pacific railroad terminates at the county seat. The chief productions in 1870 were 241,715 bushels of wheat, 1,173,201 of Indian corn, 151,067 of oats, 25,945 of Irish and 33,362 of sweet potatoes, 399,249 lbs. of butter, 36,854 of wool, 332,901 of tobacco, 1,205 bales of cotton, and 5,850 tons of hay. There were 9,682 horses, 4,150 mules and asses, 5,185 milch cows, 7,983 other cattle, 24,023 sheep, and 48,708 swine; 20 manufactories of carriages and wagons, 6 of furniture, 8 wool-carding and cloth-dressing establishments, 4 flour mills, 1 woollen mill, and 10 saw mills. Capital, Lebanon. **IV.** A S. E. county of Kansas, intersected by Verdigris and Fall rivers; area, 576 sq. m.; pop. in 1870, 6,694; in 1875, 9,750. The river bottoms are fertile, and the uplands afford good pasturage. It is well wooded, and contains beds of coal and salt springs. The chief productions in 1870 were 24,584 bushels of wheat, 126,795 of Indian corn, 24,578 of oats, 12,112 of potatoes, 52,720 lbs. of butter, and 5,583 tons of hay. There were 1,210 horses, 1,597 milch cows, 3,299 other cattle, 2,368 sheep, and 1,865 swine, and 9 saw mills. Capital, Fredonia.

WILSON, Alexander, an American ornithologist, born in Paisley, Scotland, July 6, 1766, died in Philadelphia, Aug. 23, 1813. He was the son of a distiller, and was himself a weaver and peddler. In 1790 he published a volume of poems. Having been prosecuted and punished for a lampoon at Paisley, he resolved to emigrate, and arrived at New Castle, Del., July 14, 1794, with only a few borrowed shillings, without an acquaintance, and with no decided purpose. After working at various trades, he went through New Jersey as a peddler, and during this journey seems to have first paid minute attention to the habits and appearance of birds. He afterward taught school at various places in New Jersey and Pennsylvania, finally settling in 1802 at Kingsessing on the Schuylkill. His home was near the botanical garden of William Bartram, who encouraged his taste for ornithology, and Wilson resolved to form a collection of the finest American birds. His first excursion (October, 1804) was to Niagara falls, through the then unopened wilderness of western New York. He published a metrical account of this journey in the "Port Folio," under the title of "The Foresters, a Poem." He learned drawing, coloring, and etching from Alexander Lawson, and persuaded Bradford, a Philadelphia publisher, who had employed him in editing the American edition of "Rees's Cyclopædia," to furnish funds for an American ornithology on an adequate scale. The first volume of the work appeared in September, 1808, but it was too expensive to be very successful. In January, 1810, the second volume appeared. Sailing down the Ohio in a small boat as far as Louisville, he set out on horseback from Nashville for New Orleans in May, 1811, and arrived June 6. Sailing again, he reached Philadelphia in August, and began the third volume. In September, 1812, he started on another tour to the eastern states. On his return he employed himself so unceasingly in the preparation of his work, that he impaired his already weakened constitution and hastened his death. He completed the publication of seven volumes, and the eighth and ninth were edited after his death, with a biography, by George Ord, who had been his companion in some of his journeys. The work was afterward continued by Charles Lucien Bonaparte (4 vols. 4to, Philadelphia, 1825–'33). An edition of Wilson's poems was published at Paisley in 1816, and another at Belfast in 1857. A statue of him was erected in Paisley in October, 1874.—See "Difficulties Overcome: Scenes in the Life of Alexander Wilson, the Ornithologist," by C. Lucy Brightwell (8vo, London, 1860); "Alexander Wilson, the Ornithologist: a New Chapter in his Life, embodying many Letters hitherto unpublished," by Allan Park Patton (8vo, 1863); and a volume of verse and miscellaneous prose works, with a memorial, introduction, notes, &c., by the Rev. A. B. Grosart (Paisley, 1874).

WILSON, Augusta (EVANS), an American novelist, born in Columbus, Ga., May 8, 1835. Her earlier novels were published under the name of Augusta J. Evans. In 1868 she married L. M. Wilson of Mobile, where she has since resided. She has published "Inez" (New York, 1856), written at the age of 17; "Beulah" (1859); "Macaria" (1864); "St. Elmo" (1866); "Vashti" (1869); and "Infelice" (1875).

WILSON, Daniel, an English prelate, born in London, July 2, 1778, died in Calcutta, Jan. 2, 1858. He was educated at Oxford, was ordained deacon in 1801, and in 1802 became a curate of Mr. Cecil. He became assistant tutor of St. Edmund's hall in 1804, and from 1807 to 1812 was sole tutor and vice principal, and also curate of Worton. In 1812 he left Oxford for St. John's chapel, Bedford row, London, and in 1824 received the vicarage of Islington. In 1832 he was appointed bishop of Calcutta and metropolitan of India. His principal works are: "The Christian's Struggle against Sin and Death," "Lectures on Christian Character," "Lectures on the Epistle to the Colossians," "Lectures on the Evidences of Christianity," and "Sufficiency of Scripture as a Rule of Faith." His life has been written by the Rev. Josiah Bateman (2 vols., London, 1860).

WILSON, Daniel, a British author, born in Edinburgh in 1816. He was educated at the university of Edinburgh, became secretary to the society of antiquaries of Scotland, and is a member of the royal society of Edinburgh. In 1853 he became professor of history and English literature in the university of Toronto; and in 1859–'60 he was president of the Canadian institute, the journal of which he edited for four years. His works include "Memorials of Edinburgh in the Olden Time," illustrated by himself (2 vols. 4to, 1847; 2d ed., 1872); "Archæology and Prehistoric Annals of Scotland," with about 200 of his drawings (1851; enlarged, 2 vols., 1863); "Prehistoric Man: Researches into the Origin of Civilization in the Old and New World" (2 vols., 1862; enlarged, 1865; 3d ed., rewritten, 1876, with numerous illustrations by the author); "Chatterton, a Biographical Study" (1869); "Caliban: The Missing Link" (1873); and "Spring Wild Flowers," a volume of poems (2d ed., 1875).

WILSON, Henry, eighteenth vice president of the United States, born at Farmington, N. H., Feb. 16, 1812, died in Washington, D. C., Nov. 22, 1875. His original name was Jeremiah Jones Colbath, but at the age of 17 he was authorized by the legislature to call himself Henry Wilson. He was apprenticed at 10 years of age to a farmer in his native town, with whom he continued 11 years, during which he received about 12 months of schooling, and read nearly 1,000 volumes. On attaining his majority, with all his possessions in a pack on his back, he walked to Natick, Mass., where he worked for two years at shoemaking, when he returned to New Hampshire and studied in the academies at Stafford, Wolfeborough, and Concord. His plan of education was cut short by the insolvency of the person to whom he had intrusted his savings, and he returned to Natick and resumed work as a shoemaker in 1838. In 1840 he made more than 60 speeches in behalf of Gen. Harrison, the whig candidate for president. In the next five years he was three times elected a representative from Natick to the legislature, and twice a state senator from Middlesex co. In the legislature he was known as a zealous opponent of slavery, and in 1845 he was selected in conjunction with the poet Whittier to carry to Washington the great anti-slavery petition from Massachusetts against the annexation of Texas. He was a delegate to the whig national convention of 1848, and on the rejection of anti-slavery resolutions by the convention he withdrew from it and took a prominent part in organizing the free-soil party. He purchased at this time the "Boston Republican," a daily newspaper, which he edited for two years. In 1849 he was chosen chairman of the free-soil state committee of Massachusetts, a post which he actively filled for four years. In 1850 and 1851 he was a state senator, and during both terms was president of the senate. In 1852 he was made president of the free-soil national convention at Pittsburgh, and chairman of the national committee of the party. In the same year he was the candidate of his party for congress in the eighth district of Massachusetts, where, although the majority against the free-soilers exceeded 7,500, he was defeated by only 93 votes. He was elected to the constitutional convention of 1853, and in the same year was candidate for governor, and was defeated. In 1855 he was chosen to succeed Edward Everett in the United States senate, and shortly after taking his seat made a speech advocating the repeal of the fugitive slave law and the abolition of slavery in the District of Columbia and in the territories. For a brief period in 1855 he was associated with the American party; but on the adoption of a pro-slavery platform by the national council of that organization, he withdrew from it and assisted in organizing the republican party on the basis of opposition to the extension of slavery. When, in May, 1856, Mr. Sumner, his colleague, was assailed by Mr. Brooks of South Carolina, Mr. Wilson in a speech to the senate denounced the act as a "brutal, murderous, and cowardly assault." For this he was challenged by Mr. Brooks, but declined to accept the challenge on the ground that duelling is a barbarous practice which the law of the country has branded as a crime. During the four following years Mr. Wilson took part in all important debates in the senate, and made elaborate speeches, remarkable for fulness and accuracy of statement, on Kansas, the treasury note bill, the expenses of the government, the tariff, the Pacific railroad, and many other topics. His speech in defence of free labor, in reply to Senator Hammond of South Carolina, March, 1859, attained an immense circulation through the free states. In January of the same year the Massachusetts legislature reëlected him to the senate by nearly a unanimous vote. In March, 1861, he became chairman of the committee on military affairs, and so remained till the end of the civil war. In the regular session of 1861–'2 Mr. Wilson introduced the bills for abolishing slavery in the District of Columbia, for abolishing the "black code," and for enrolling colored men in the militia, and granting freedom to all who entered the military service of the United States and to their families. After the close of the war he took a prominent part in the legislation for the reduction of the army and for the reconstruction of the southern states. He advocated the mildest measures toward those states, and also the granting of all political and civil rights to the colored population. In 1865 the Massachusetts legislature elected him for the third time to the senate. In 1870 he made a summer visit to Europe. In 1872 he was nominated by the republican national convention for vice president, with Gen. Grant for president, and was elected. In the following year Mr. Wilson while at Boston sustained a shock of apoplexy, causing partial paralysis, from which he had nearly recovered when on Nov. 10, 1875, a second shock prostrated him in the capitol. For twelve days he lay ill in the vice president's room, and died very suddenly from a third shock. In the latter years of his life he wrote the following books: "History of the Anti-Slavery Measures of the 37th and 38th United States Congresses" (Boston, 1864); "History of the Reconstruction Measures of the 39th and 40th Congresses" (Hartford, 1868); and "History of the Rise and Fall of the Slave Power in America" (3 vols., Boston, 1871-'6). The last is his principal work, and the third volume was not quite finished when he died.

WILSON, Horace Hayman, an English orientalist, born in London in 1786, died there, May 8, 1860. He studied medicine, and went to Calcutta in 1808 as assistant surgeon in the East India company's service, but was attached to the mint at Calcutta, and afterward became assay master and secretary. In 1812 he was elected secretary of the Asiatic society of Bengal, and in 1819 was appointed on the commission to remodel the Sanskrit college at Benares. He was elected Boden professor of Sanskrit at Oxford in 1833, and was appointed librarian at the East India house, and director of the royal Asiatic society. He published a "Sanskrit and English Dictionary" (Calcutta, 1819; 2d ed., enlarged, London, 1832); "Specimens of the Theatre of the Hindus, with Plays" (2 vols., Calcutta, 1826-'7; 2d ed., London, 1835), with translations and valuable disquisitions; "History of British India from 1805 to 1835" (3 vols., London, 1844-'8); "Sanskrit Grammar" (2d ed., London, 1847); besides translations of the *Meghadûta*, the *Sakuntalâ*, the *Vishnu-Purâna*, a great part of the *Rig-Veda*, and other works. He made a Bengalee translation of Todd's edition of Johnson's English dictionary (2 vols., Calcutta, 1843).

WILSON. I. James, a signer of the Declaration of Independence, born near St. Andrews, Scotland, in 1742, died in Edenton, N. C., Aug. 28, 1798. He studied at St. Andrews, Edinburgh, and Glasgow, and in 1766 emigrated to Philadelphia, where he was admitted to the bar. He sat in the provincial convention of Pennsylvania in 1774, and in May, 1775, was chosen a member of the continental congress, and was repeatedly rechosen. Upon the commencement of hostilities he obtained a colonel's commission. From 1779 to 1783 he was advocate general of France in the United States. He was a member of the convention that framed the federal constitution, and of the Pennsylvania convention that adopted it, and was one of the first judges of the supreme court of the United States. In 1790 he became the first professor of law in the college of Philadelphia, and delivered lectures which were published together with others of his works by his son (3 vols., Philadelphia, 1803-'4). **II. Bird**, an American clergyman, son of the preceding, born in Carlisle, Pa., Jan. 8, 1777, died in New York, April 14, 1859. He graduated at the college (now university) of Pennsylvania in 1792, was admitted to the bar in 1797, and was appointed president judge of the court of common pleas of the seventh circuit at the age of 25. Afterward he studied for the ministry of the Episcopal church, and was admitted to orders March 12, 1819. He became rector of St. John's church, Norristown, in 1820, and in 1821 was appointed professor of systematic divinity in the Episcopal general theological seminary, New York, which chair he resigned in 1850. He was secretary of the house of bishops from 1829 to 1841. Besides editing his father's works, he published "Abridgment of the Law by Matthew Bacon," with notes, &c. (7 vols., 1811-'13), and "Memoirs of the Life of the Rt. Rev. Bishop White" (1839).

WILSON. I. John, a Scottish author, popularly known as Christopher North, born in Paisley, May 19, 1785, died in Edinburgh, April 3, 1854. He was educated at Glasgow university and at Oxford, where in 1803 he gained the Newdigate prize for an English poem "On the Study of Greek and Roman Architecture." He was the boldest rider, the stoutest oarsman, and the most indefatigable walker among his contemporaries, and frequently distinguished himself in the "gown and town" riots. He graduated B. A. in 1807, and soon afterward purchased a small estate called Elleray on Lake Windermere, in Westmoreland, in the immediate vicinity of the residence of Wordsworth, where he lived two years. He married in 1811, and in 1812 published "The Isle of Palms," a poem of the lake school, abounding in glowing descriptions of tropical scenery. In 1815 he was admitted to the Scottish bar, at which however his practice was only nominal. In 1816 appeared his "City of the Plague," a dramatic poem on the great plague of London in 1665. He was one of the chief contributors to "Blackwood's Edinburgh Magazine" from its first appearance in 1817, writing tales, criticisms, and discursive essays which greatly promoted its popularity. In 1820, through the efforts of Scott and other influential friends, he was appointed professor of moral philosophy in the university of Edinburgh, as successor of Dr. Thomas Brown; and for the next 30 years he lectured to large classes. In 1822 he published "Lights and Shadows of Scottish Life," a collection of tales, in 1823 "The Trials of Margaret Lyndsay," and in 1824 "The Foresters." He acquired his greatest reputation as the chief author of the "Noctes Ambrosianæ," contributed to "Blackwood" between 1822 and 1835; and his pseudonyme of "Christopher North," adopted in connection with these amusing papers, became almost as widely known as his own proper name. A complete edition, containing "Christopher in the Tent," contributed by Wilson to "Blackwood" in 1819, and which forms a prelude to the "Noctes," was published in New York by R. Shelton Mackenzie, with biographical notices and numerous notes (5 vols., 1857; revised ed., 1863). In 1841 he published an elaborate "Essay on the Genius and Character of Burns;" in 1842 "The Recreations of Christopher North," comprising selections from his contributions to "Blackwood;" and between June, 1849, and September, 1852, he wrote the series entitled "Dies Boreales, or Christopher under Canvas." In 1851 he was smitten with paralysis, and was obliged to resign his professorship. The crown soon after granted him a literary pension of £300. A bronze statue of Wilson, of heroic size, executed by Steel, has been erected in the Princess street gardens, Edinburgh. His works have been edited in 12 vols. by his son-in-law, Professor Ferrier; and a memoir from family papers, with a selection from his correspondence, by his daughter, Mrs. Gordon (2 vols., Edinburgh, 1862). **II. James,** a Scottish naturalist, brother of the preceding, born in Paisley in 1795, died near Edinburgh, May 18, 1856. He wrote the articles on natural history for the seventh edition of the "Encyclopædia Britannica," and revised and extended them for the eighth. He also published "A Voyage round the Coasts of Scotland and the Isles" (2 vols., 1842) and "Illustrations of Scripture by an Animal Painter." Dr. Hamilton of London published a memoir of him in 1859.

WILSON, Richard, an English painter, born in Montgomeryshire in 1713 or 1714, died at Llanferras (now called Loggerheads from a painting by him on a tavern signboard there), Denbighshire, in 1782. For many years he painted portraits in London. In 1749 he went to Italy, and discovered a remarkable talent for landscape painting. Returning to London in 1755, he practised his art there for nearly 25 years. Most of his pictures were sold to the dealers for very small prices. Not a few were subsequently sold for 100 times as much as they brought him. Of some of his best works he made several repetitions with slight modifications. Many of them have been admirably engraved by Woollett, Sharpe, and others. He was one of the founders of the royal academy, and for several years its librarian.

WILSON, Sir Robert Thomas, an English general, born in London in 1777, died there, May 9, 1849. He was the son of Benjamin Wilson, a painter and writer on electricity, and was educated at Westminster and Winchester. In 1793 he went to Flanders as a volunteer, and in 1794 obtained a commission in the 15th dragoons. He served in Ireland during the rebellion of 1798, and subsequently in Holland, Brazil, and at the Cape of Good Hope. In 1808 he raised the Lusitanian legion in Portugal, and afterward commanded a Spanish brigade under Wellington, and was in the battle of Talavera. From 1812 to 1814 he served as British military commissioner at the headquarters of the Russian and of the allied armies. For his open disapproval of the course pursued toward Queen Caroline, he was dismissed from the army. From 1818 to 1831 he was a member of parliament. After the death of George IV. he was restored to his rank in the army, in 1841 became a general, and from 1842 was governor and commander-in-chief of Gibraltar. He translated Regnier's "Campaign in 1801 in the East and in Egypt," and wrote "History of the British Expedition to Egypt" (1802). He also published "An Inquiry into the Present State of the Military Force of Britain" (1804); "Character and Composition of the Russian Army, and a Sketch of the Campaigns in Poland, 1806-'7" (1810); and "A Sketch of the Military and Political Power of Russia" (1817). His posthumous journals have been edited by his nephew the Rev. Herbert Randolph (5 vols. 8vo, 1860-'63).

WILSON, William Dexter, an American clergyman, born in Stoddard, N. H., Feb. 28, 1816. He studied in the theological department of Harvard university, and in 1842 was ordained to the ministry in the Protestant Episcopal church. He soon afterward published a small book on "The Constitution of the Christian Church" (enlarged and republished under the title of "A Manual of Church Principles," Baltimore, 1846). In 1847 he edited Bishop Mant's *Horæ Liturgicæ* under the title "An Explanation of the Rubrics of the Book of Common Prayer" (revised ed., New York, 1864), and in 1848 published a "History of the Reformation in England." In 1848-'9 he wrote a series of essays under the title of "The Church Identified," which were afterward collected in a volume (Utica, N. Y.; enlarged ed., New York, 1850; last ed., 1859). In 1850 he was elected professor of history and moral and intellectual philosophy in Geneva college, N. Y.; and in 1868 he became professor of moral and mental philosophy in Cornell university. He has also published an "Elementary Treatise on Logic" (12mo, New York, 1856); "Psychology, Comparative and Human" (1871); "Text Book of Logic" (1872); and "Introduction to the Study of the History of Philosophy" (1872). Besides many contributions to reviews, he has furnished a paper on "Local Climatology" to the report of the regents of the state of New York for 1867, and one on "The Nature of Mathematics and the Method of Treating them" to the "Proceedings of the University Convocation" for 1867.

WILTSHIRE, or **Wilts,** a S. county of England, bordering on the counties of Gloucester, Berks, Southampton, Dorset, and Somerset; area, 1,343 sq. m.; pop. in 1871, 257,202. It is almost quadrangular, and is divided by the Upper Avon and Kennet rivers and the canal which connects them into two nearly equal portions. The northern division is flat and composed of rich and fertile lands; the southern is undulating and elevated, having some valleys and the considerable unenclosed plateau of Salisbury plain. The county is drained by the Thames and the Upper and the Lower Avon. The greater part of the surface is in pasturage, sheep being raised in the south and cattle in the north. The manufactures include cutlery, steel goods, carpets, woollen goods, and silks. Wiltshire is remarkable for its druidical remains, including Stonehenge and Avebury, ancient earthworks and dikes, Roman roads and encampments, and mediæval ruins. The principal towns are Salisbury, the capital, Trowbridge, Wilton, Devizes, Bradford, Chippenham, Warminster, Malmesbury, Westbury, Calne, and Marlborough.

WIMPFFEN, Emmanuel Félix de, a French soldier, born in Laon, Sept. 13, 1811. He belongs to a distinguished Swabian family. Count Franz (1797–1870) was an Austrian field marshal; Franz Ludwig von Wimpffen-Berneburg (1732–1800) served in the French and Würtemberg armies; and Baron Felix von Wimpffen-Berneburg (1745–1814) was a French general. Emmanuel Félix, son of the latter, was educated at St. Cyr, and served in Algeria, in the Crimea, and in the Italian war of 1859, when he became general of division. He was afterward governor of Algiers and Oran. In July, 1870, he carried the declaration of war to Berlin. In August Palikao placed him in command of the 12th corps, and, after Failly's removal, of the 5th corps. On Aug. 30 he reached Sedan with an order of Palikao to rank second in command. As he found the army in a critical condition, he withheld it until the morning of Sept. 1, and for several hours after MacMahon had been wounded and replaced by Ducrot, when, expecting a victory, he superseded the latter, and at once countermanded the retreat which might have saved a part of the army. He had allowed himself to be deceived by a Prussian brigade falling back and by a momentary cessation of firing, without perceiving the flank movement which enabled the Germans to surround the French, who in the afternoon were everywhere beaten. Wimpffen in vain proposed to the emperor to escape, and offered his resignation, which was declined. He concluded the capitulation with Moltke, and Stuttgart was assigned to him as a residence. In 1871 he was summoned before the parliamentary commission at Versailles, which made him responsible for a great part of the catastrophe. To vindicate himself he published *Sedan* and *Réponse au général Ducrot, par un officier supérieur* (1871). Subsequently he attacked the ex-emperor in Edmond About's *Le XIX^{ème} Siècle*, which caused Granier de Cassagnac to denounce him in the *Pays* as a traitor who had lost the army by his vanity and incapacity. Wimpffen arraigned him before the civil tribunal, but Cassagnac denied the jurisdiction of this court, in which no proof of justification is allowed. In 1875 Wimpffen brought before the court of assizes in Paris a criminal suit for defamation, and employed Jules Favre as his advocate; Cassagnac was defended by Lachaud. At the trial, which took place in February, Wimpffen was unable to get a single general officer on his side, some colonels and civilians constituting all his witnesses. Cassagnac was acquitted, and Wimpffen was sentenced to pay the cost of the trial. In April, 1876, he was an unsuccessful candidate for the legislative body.

WINCHELL, Alexander, an American geologist, born in Northeast, Dutchess co., N. Y., Dec. 31, 1824. He graduated at Wesleyan university in 1847, taught natural sciences in New York and Alabama, became professor of physics and civil engineering in the university of Michigan in 1853, and in 1855 was transferred to the chair of geology, zoölogy, and botany, which he occupied for the next 18 years; and from 1866 to 1869 he held at the same time the chair of geology, zoölogy, and botany in Kentucky university. He was state geologist and naturalist of Michigan from 1859 to 1862. In 1860 he submitted the "First Biennial Report of the Progress of the Geological Survey," and in 1865 published a "Geological Map of Michigan." In 1866 he made the survey of the Grand Traverse region of Michigan, and furnished a report thereon. In 1869 he was appointed director of the geological survey of Michigan. In 1870 he published "Winchell's Geological Chart and Key," and "Report of the Progress of the Geological Survey." He made an official geological survey of salt lands in Minnesota in 1870, and published "Geology of the Stars" and "Topographical Data of Michigan." He was elected chancellor of Syracuse (N. Y.) university in 1872, resigned in 1874, and is now (1876) professor of geology and zoölogy in that institution, and a special lecturer in Vanderbilt university. He has also published about 200 papers, mostly on scientific subjects, "Genealogy of the Winchell Family" (1869), and "Sketches of Creation" (New York, 1870), and has in press (1876) a work entitled "Lay Theology."

WINCHESTER, a city and the county seat of Frederick co., Virginia, in the lower Shenandoah valley, 67 m. W. N. W. of Washington, and 32 m. W. S. W. of Harper's Ferry by the Winchester, Potomac, and Strasburg division of the Baltimore and Ohio railroad; pop. in 1860, 4,392; in 1870, 4,477, of whom 1,377 were colored; in 1875, about 5,000. It is about 1½ m. long by ½ m. wide. The streets are well paved or macadamized. The court house and jail are of brick, and most of the houses are of brick or limestone. The principal manufactories are one of shoes, three of furniture, four of gloves, one of soap, one of agricultural implements, a sumach and bark mill, a flour mill, two iron founderies, and five tanneries. There are two banks, six free public schools (four white and two colored), a male high school, four female seminaries, two weekly newspapers, and 15 churches (several having fine buildings), viz.: 3 Baptist (2 colored), 1 Church of God, 1 Episcopal, 1 Friends', 1 German Reformed, 1 Lutheran, 2 Methodist Episcopal (1 colored), 1 Methodist Episcopal, South, 2 Presbyterian, 1 Roman Catholic, and 1 United Brethren.—The first settlers of Winchester were principally Germans. It was laid out as a town in 1752, and incorporated in 1779. A portion of Fort Loudoun, built by Washington in the autumn and winter of 1754, is still standing. Winchester furnished a large number of men to the revolutionary armies, including Gen. Daniel Morgan. From its situation Winchester is the key to the valley of the Shenandoah. In June, 1861, Gen. J. E. Johnston fell back from Harper's Ferry and intrenched himself at Winchester. On July 18 he moved the bulk of his army to join Beauregard at Bull Run, leaving his sick at Winchester; and after that battle the place was reoccupied by the confederates under Jackson. In March, 1862, they moved up the valley, and Winchester was occupied by a Union force under Banks. On March 23 Jackson attacked Shields, who was in command of a division of Banks's troops, at Kernstown near Winchester, but was repulsed and retreated up the valley. The Union loss was 103 killed and 441 wounded; of the confederates 270 were buried on the field, and they lost several hundred prisoners, most of them wounded. The Union forces in northern Virginia were soon widely scattered. Banks with about 6,000 men was isolated at Strasburg, 20 m. S. of Winchester, to which he had begun to fall back when Jackson undertook to intercept him by a rapid march. After some skirmishing Banks reached Winchester, whence on May 25 he retreated to the Potomac, being closely pursued and losing about 900 men, mostly prisoners. Lee's operations in the autumn of 1862 gave the confederates possession of Winchester, which they held for some months, when it came again into the hands of the federals. In June, 1863, it was occupied by about 7,000 men under Milroy. The advance of Lee's army, moving toward Pennsylvania, appeared in force near the town on the 13th; Milroy retreated toward Harper's Ferry, but was intercepted (June 15), and his troops were captured or dispersed, the cavalry only escaping. Besides a few killed and wounded, he lost 4,000 prisoners, about 30 guns, many small arms, and nearly 300 wagons; the confederate loss was 47 killed and 219 wounded. On July 24, 1864, Crook with a small Union force unexpectedly encountered Early near Winchester, and on the 24th was defeated with a loss of 1,200. In August Sheridan was placed in command on the Shenandoah, and soon moved upon Winchester. Early fell back, and Sheridan took up a position about 10 m. E., while Early occupied the town, his principal force being on the Opequan creek, 4 m. distant. Here he was attacked on Sept. 19 by Sheridan, defeated, and driven back to Winchester, whence during the night he fell back 8 m. further to Fisher's Hill, where he took up a strong position. This action is called by the confederates the battle of Winchester, by others that of the Opequan. The Union loss was 4,990, of whom 653 were killed, 3,719 wounded, and 618 captured. The entire confederate loss was probably about 6,000; 2,000 wounded were found in the hospitals at Winchester, and nearly 3,000 prisoners were captured on the field and in the pursuit. On the 22d Sheridan attacked Early at Fisher's Hill, and routed him after a brief action. The loss in killed and wounded was about 300 on each side, the confederates also losing 1,100 prisoners. Sheridan pursued up the valley for nearly 50 m., when he returned to Cedar creek, half way between Fisher's Hill and Winchester. At daybreak of Oct. 19, after a rapid night march, Early surprised the Union camps at Cedar creek, captured more than 20 guns, and before 9 o'clock seemed to have won a complete victory. But most of his men scattered themselves in search of food and plunder, and the federals, after being hotly pursued three miles, began to make a stand. Sheridan, who had been called to Washington, and had slept the night before at Winchester, was riding toward the front, and when a mile and a half from the town he met the fugitives. With a brigade which had been left at Winchester he moved upon the enemy, who had begun to intrench themselves. The action was sharp but brief, and resulted in the rout of the confederates, who abandoned all their guns and trains. Early's army was completely broken up. The Union loss at Cedar creek was 5,990, including about 2,000 temporarily missing. The confederate loss was barely half as great; there were 1,500 prisoners, and about as many killed and wounded.

WINCHESTER (Anglo-Sax. *Witanceaster;* anc. *Venta Belgarum*), a city and the capital of Hampshire, England, on the Southwestern railway, 12 m. N. N. E. of Southampton, and 62 m. S. W. of London; pop. in 1871, 16,366. It is on the right bank of the river Itchin, which is navigable to the sea as a canal. The ancient W. gateway, surmounted by a massive Norman tower, is still entire. The cathedral is 545 ft. long, the width of the transepts 186 ft., and the height of the tower, which rises only 26 ft. above the roof, 139 ft. It was first built in 648, and parts of the present edifice date from about 980. The church of St. Lawrence is also very ancient; there are several other churches, and a Benedictine nunnery. Winchester college, founded by William of Wykeham in 1387, occupies an extensive range of buildings. The town hall, the chapel of the old castle, now converted into a county hall, and containing the curious round table, said to have been King Arthur's, suspended above the judge's seat; the barracks for 2,000 men, occupying a splendid building, once the palace of Charles II.; a fine county hospital; St. John's house, once belonging to the templars, now a public assembly room; and the ruins of Wolvesey castle, are particularly interesting. There are also a small theatre and a public library and reading rooms. There are no important manufactures.—Winchester was a place of importance in the days of the ancient Britons, who called it Caer Gwent or the White City. The Romans are supposed to have built the walls. In 519 Cerdic, the Saxon chief, captured it, and afterward made it the seat of his government. Under the Danes it became the capital of England, and so remained until after the reign of Henry II.

Winchester Cathedral.

WINCHESTER, Elhanan, an American clergyman, born in Brookline, Mass., Sept. 30, 1751, died in Hartford, Conn., April 18, 1797. In 1769 he united with a Separate church in Brookline, began preaching, joined the open communion Baptists in Canterbury, Conn., in 1770, and in 1771 was ordained pastor of a church in Rehoboth, Mass. He soon became a restricted communionist, was excommunicated by his church, and in 1780 became pastor of the first Baptist church in Philadelphia. Next avowing his belief in the final restoration of the wicked to holiness, he founded with most of his congregation a new church. From 1787 to 1794 he preached his new doctrine in England, and published several works there on the subject. His publications include more than 40 volumes.

WINCKELMANN, Johann Joachim, a German archæologist, born in Stendal, Prussia, Dec. 9, 1717, murdered in Trieste, June 8, 1768. He was the son of a poor shoemaker, and struggled with adversity while pursuing desultory studies at Stendal, Berlin, Salzwedel, and the universities of Halle and Jena, attaining great proficiency in the ancient languages and familiarity with writings on art. After teaching for five years at Seehausen, he was employed as librarian by Count Bünau at Nöthnitz near Dresden. The art gallery of that city, and Oeser and other painters whom he met, inspired him with a desire to visit Rome, and the nuncio Archinto promised him employment on condition of his joining his church, to which he consented in 1755, after five years of hesitation, but without change of belief. In the same year the pope granted him a small pension for two years, which enabled him to go to Rome, where he arrived in November. Here he met Raphael Mengs, who stimulated his love of ancient art, and became librarian to his Dresden patron, Cardinal Archinto, while the largest private library of Rome, that of Cardinal Passionei, afforded him vast materials for research. His position was greatly improved by Cardinal Alessandro Albani, who appointed him librarian and lodged him in his palace and in his villa near the Porta Salara, and whose celebrated collections opened new sources of information. In 1763 he became prefect of antiquities and Hellenist of the Vatican library. He visited Florence, Naples, Portici, Herculaneum, and Pompeii, and was so much attached to Italy that he declined an appointment at Berlin. In 1768, after starting on a journey to Germany with the sculptor Cavaceppi, he became melancholy as soon as he had left the Italian soil, and could not be persuaded to go beyond Vienna. Returning to Rome by way of Trieste, he was assassinated by a professional thief named Arcangeli, who after winning his confidence killed him for the sake of some rare gold coins which Maria Theresa had presented to him.—Winckelmann is regarded as the founder of scientific archæology and of the historical and critical investigation of antiquities; he modified all the old theories of the beautiful, and revived in art and poetry the classical spirit of ancient Greece. His views suggested Lessing's *Laokoon*, and under the influence of Heyne they imparted a powerful impulse to the Augustan period of German poetry, which was nobly appreciated in Goethe's *Winckelmann und sein Jahrhundert*, published in conjunction with H. Meyer and other writers (Tübingen, 1805). His most celebrated work is *Geschichte der Kunst des Alterthums* (1764), with its supplement entitled

Anmerkungen über die Geschichte der Kunst (1767), and included in the Vienna edition of 1776. It has been translated into French and Italian, and into English by Giles Henry Lodge (2 vols. 4to, Boston, 1849; new ed. with a life of Winckelmann, 4 vols. 8vo, 1856–'72). His other works include *Gedanken über die Nachahmung der griechischen Werke in Malerei und Bildhauerkunst* (Dresden and Leipsic, 1755); *Description des pierres gravées du feu baron de Stosch* (Florence, 1760); *Monumenti antichi inediti* (2 vols., Rome, 1767–'8; 2d ed., 1821); and several reports on Herculaneum and other sites, and minor though influential æsthetical essays, comprising *Versuch einer Allegorie* (Dresden, 1766; enlarged from manuscripts, 1866). Fernow began and Heinrich Meyer and Schultz completed an edition of all his writings (8 vols., Dresden, 1808–'20). Parts of his correspondence are contained in a reprint of this edition (1828 *et seq.*), in *Winckelmann's Briefe*, edited by F. Forster (2 vols., Berlin, 1824), and in other publications. Rossetti published *Il sepolchro di Winckelmann in Trieste* (Venice, 1823), relating to his grave in the cemetery adjoining the cathedral in that city, where a monument to him has been erected. Forchhammer and Otto Jahn instituted Winckelmann festivals at leading German universities. His birthday is annually celebrated by the archæological institute in Rome and by archæologists in Berlin; and a branch of the former was on his anniversary in 1874 established at Athens. The best biography is Karl Justi's *Winckelmann, sein Leben, seine Werke und seine Zeitgenossen* (3 vols., 1866–'73).

WIND, a sensible movement of the air with reference to the earth's surface. The horizontal component of this movement is usually that which is specially referred to by the term wind, but the powerful vertical movements that take place in tornadoes and other severe storms may also be included under the same heading. In general, a wind is the result of an initial, local disturbance of the density of the atmosphere, in consequence of which the air is set in motion; its motion is then modified by the resistance of the earth's surface and by the diurnal rotation of the earth about its axis, and may be propagated into regions far distant from the original seat of disturbance.—In keeping a record of the wind observed at any station, it is important to note both the duration and the force or velocity; directions should be recorded with reference to the true, not the magnetic meridian, and should be given to the nearest half point of the compass card. The force may be estimated and expressed in an arbitrary scale on which zero (0) denotes calm, and 10 the high winds of a destructive hurricane or tornado. Arbitrary scales of 0 to 12, 0 to 6, and 0 to 4 are in use in various countries; but the scale 0 to 10 will, it is hoped, gradually supersede these. When possible, the force of the wind should be measured by an anemometer, the principal forms of which instrument are: the Robinson anemometer, measuring the velocity of the horizontal movement of the wind by the revolution of a vertical spindle to the top of which are attached four horizontal arms, each bearing at its extremity a hemispherical cup; and Wild's tablet anemometer, consisting simply of a small plane tablet so suspended from a wind vane that its axis is always perpendicular to the direction whence the wind blows; this tablet hangs by a hinge, so that it is deflected from its vertical position by an angle increasing with the force of the wind, and which is measured by a scale of degrees. This latter instrument gives therefore the strength of each gust, while the Robinson anemometer gives the total movement of the air during any prescribed interval. The numerous careful investigations that have been made into the accuracy of the records of these simple instruments have justified their extended adoption within the past few years. Other forms of the anemometer are described under that title. As the velocity of the wind is independent of the instrument by means of which it is measured, while the pressure of the wind varies according to the shape, &c., of the surface against which it acts, it is now customary to convert the indications of all forms of anemometers into velocities, *i. e.*, miles per hour or metres per second. The most recent investigations bearing on this matter have been published by Cavallero (Turin, 1873), Phillips (London, 1874), Hagen (Berlin. 1874), and Thiesen and Dohrandt (St. Petersburg, 1875).—The great importance of correctly understanding the laws of the winds has led to the accumulation of a vast mass of observations thereon. Among the treatises containing large collections are Kämtz, *Lehrbuch der Meteorologie;* the article on wind by Muncke in Gehler's *Wörterbuch;* Maury, "Wind and Current Charts;" Buys-Ballot, *Windkaartjes van den noorden Atlantischen ocean;* Buchan, "Distribution of Pressure and Winds;" Muhry, *Allgemeine Klimatologie;* Hann, *Untersuchungen über die Winde;* Schmid, *Meteorologie;* the admiralty wind and current charts; and above all, Coffin's "Winds of the Globe" (Washington, 1876). This latter immense work is a new edition of Coffin's "Winds of the Northern Hemisphere" (Washington, 1856), and embraces a collection and summary of the results of all the observations during the past 100 years. The study of so extensive a series of observations shows that some winds have a local or temporary character, while others are very permanent or prevail over large areas. These latter movements are generally spoken of as currents, as distinguished from the local or temporary movements which retain the designation winds. 1. If we compute the resultant of all the motions to which the air at any place has been subjected during a year or a month, we arrive at the most general view that can be taken of the movement of the atmosphere. The resultants for the United States are given in plates ix. and x. of the "Statistical Atlas" of the census bureau (Washington, 1874). But as the number of observations of the actual wind velocities is insufficient, an attempt has been made, first by Lambert, but principally by Coffin, to make use of the estimated wind force, and even to deduce resultants based on the assumption of an equal average velocity for each wind. The result may be stated in general terms as follows: Between the latitudes 30° N. and 30° S. the lowest stratum of air moves westward; between these parallels and the respective poles the resultant motion of the lowest stratum of air is eastward. 2. The movements of the higher strata of the atmosphere are of equal importance to a proper understanding of the whole subject, but are much more difficult of investigation. In general, the observations of the motions of the clouds, of the courses of balloons, and of the winds on mountains show that between the tropics the upper current has a resultant motion toward the east, while beyond the tropics the resultant is toward the east only for the highest stratum of cirrus clouds, and is for the lower clouds occasionally toward the west, depending apparently on some special causes. A few observations of the trails left by shooting stars show that at heights of from 5 to 100 m. a great diversity of currents prevails, but that no one direction predominates. 3. The most important of the general and periodical currents are the trade winds, which prevail between the parallels of 30° N. and 30° S. latitude, but attain their full breadth and force only in mid-ocean, and are very materially circumscribed near the eastern and western continents. The breadth of the trade-wind zone of the Pacific ocean is not so well determined as in the Atlantic, and the trades of the Indian ocean offer notable irregularities depending on the seasons. The whole system of trade winds is divided by a belt of calms in the neighborhood of the equator, separating the N. E. winds of the northern from the S. E. winds of the southern hemisphere. Although the position of this calm belt, and also of the exterior limits of the trade winds, lies a little northward in August and September and southward in March of its mean position, yet these slight seasonal changes do not deprive the whole system of winds of their permanent character. In the equatorial belt of calms heavy rains constantly occur; but in the trade-wind region proper few clouds and light showers are observed. 4. The term anti-trades designates the currents that prevail quite uniformly above the trade winds, at a height of 3,000 ft. or more above the earth's surface; this current, known also as the "upper trade" or "return trade," seems to be merely the return to the temperate zones of the air that had flowed at the surface toward the equator. 5. The term monsoons, from a Malaysian or Arabic word signifying "seasonal," is applicable to all winds that with the season change their character from being land winds to sea winds. Thus, on the W. coast of Africa in summer, the regular N. E. winds are deflected decidedly toward the continent; in Australia and in North America similar phenomena are noted; but the most striking case is that of India, where the N. E. trade wind of the northern portion of the Indian ocean is completely reversed during summer, but in winter is greatly reënforced by the land and sea winds that thus alternate between N. E. and S. W. (See Blanford's "Winds of Northern India," London "Philosophical Transactions," 1874.) The ancient Greeks designated certain winds that came and went with the season as Etesian winds. 6. Similar to the monsoons, but less decidedly pronounced, are the day breeze and night breeze, or the land wind and sea wind. These winds follow each other as do the diurnal changes of temperature on which they depend; they are generally felt most distinctly but a few miles (rarely 50) from mountain ranges or coast lines, and are much feebler than the monsoons. 7. There are numerous special winds, known usually by special local names. Thus we have in Italy the following terms for the respective winds: for the N. wind, *tramontana;* the N. E., *greco;* the E., *levante;* the S. E., *sirocco;* the S., *ostro;* the S. W., *libeccio;* the W., *ponente;* the N. W., *maestro* or *maestrale.* The last is known as the *mistral* in France, and at Nice blows from the north, but at Toulon from the northeast; it is in fact simply the strongest of the winds, as the etymology of the name implies. In Greece the mistral blows from the northwest, and brings cool moist air from the Adriatic after a season of rainy weather. A similar latitude is customary in the appellations of the other winds; thus at Athens the warm damp S. or S. W. wind is termed the sirocco, and brings the heavy rains of autumn and winter; in Madeira, on the other hand, the sirocco is a very dry hot wind from E. S. E.; in Sicily the sirocco wind is so oppressive by reason of the heat and dampness that both men and animals suffer extremely. In Spain the same wind is known as the *solano*, and in Turkey as the *samiel.* The *föhn* wind, as it is called in the Alps, was until lately usually described as a continuation of the sirocco; but as now more philosophically explained, it may be described as a warm or hot dry wind with hazy weather; it blows down the mountain sides and valleys, and, although generally spoken of as a S. wind, is often a N. wind. On the windward side of a mountain range the föhn is moist like the sirocco; on the leeward side it is drier. It is found on a careful examination that winds similar to the föhn exist in every mountainous region; indeed, in the Rocky mountains and the Himalaya its distinctive characters are even more decided.—Of the hot winds, none is more famous than the *simoom* of northern Africa and Arabia. The many fables and exaggerated accounts of ancient travellers have been materially modified by exact observations of recent investigators, from which it appears that this is a strong, hot, dry wind drawn from the heated interior of the continent; it is frequently accompanied by sand clouds or sand pillars, and its deadly qualities, if such it has, are simply the result of the oppressive heat and the very fine dust. Similar hot winds prevail in Egypt in May and June, and are there known as the *khamsin.*—Of the dry winds that flow out from the interior of continents or down the slopes of mountain ranges, some are cold, others warm. Thus the northers of Texas are due to a thin surface layer of dry air, which as it flows from the Rocky mountains, from Kansas, and from Minnesota, southward or southeastward, continually loses by radiation the heat it receives from the sun, and, underflowing the warmer, moister air of the gulf of Mexico, rushes over the smooth surface of the water with thrice the velocity that is observed in the interior of the continent. On the W. coast of Africa the dry E. and N. E. winds are known as the *harmattan;* these are cooling on account of their extreme dryness, and in every detail offer a parallel to the northers, except that they have a higher temperature, and are frequently accompanied by sand, which is rarely or never found in Texas. The dry cold wind flowing southward from the Himalaya over India is there known as the *tereno.* In South America, from Patagonia to Brazil, there occurs a similar dry wind known as the *pampero*, which flows almost uninterruptedly from the Andes E. and S. E. to the Atlantic. Similar strong, cold, dry winds flowing from central Europe southward over the Adriatic and Black seas are known there as *bora* (with which the *euroclydon* of St. Paul may be identical). At Malta the N. E. wind is the *gregale.* In southern Arabia the cold N. N. W. wind of winter is the *belat.* Perhaps the most thoroughly desiccated of any of the winds that have been observed as yet are the S. E. or *puna* winds of eastern Peru and the N. or *buran* of Thibet, on which table lands cold dry gales prevail, which are highly disagreeable to human beings and even to animals. Similar dangerous gales are called *purgas* in Labrador, *guxen* in Switzerland, *gallegos* in Spain, and *tourmentes* in France. The dry east winds of spring in Great Britain have been from time immemorial proverbial for their injurious effects on delicate constitutions, and the very dry west winds of the United States E. of the Rocky mountains contribute, it is very plausibly urged, to the nervous temperament of the nation. The prevailing winds being westerly both in Europe and North America, it follows that the former continent enjoys a much moister and more agreeable climate, and one much less provocative of nervous diseases.—Of the names given to certain storm winds as such, we may mention the *levante*, a strong east wind in the eastern part of the Mediterranean; the hurricane, a term derived from the *ouracan* of the Carib Indians, and applied by them to the terrific storms of the West Indies; the typhoon, a term of most ancient origin, nominally derived from the Chinese *tae-fun* as applied to the great storms of the Pacific ocean, but curiously related to the name Typhon applied by the Egyptians and Greeks to a dreaded divinity; finally, the tornado, a term applied in America to destructive winds that rush in narrow paths over long belts of territory, accompanied by whirling clouds and heavy rain or hail. The name tornado (Port. *tornar*, Sp. *tornear*, to turn) was originally given by the Peninsular navigators to the violent local storms that occur a short distance off the coast of Africa, and was subsequently applied very properly by them to the similar violent storms of our southern states. Less perfectly developed but still destructive tornadoes occur in all parts of the United States. Of local American terms we record only the expressive name "blizzard" given in the states W. of the Mississippi river to the blinding storms of sleet or snow and high N. wind that suddenly follow warm spring-like days in winter and early spring. Similar storms of similar origin occur in the steppes of southern Russia, where they are known as *viuga.* In the Sandwich islands the S. wind preceding a hurricane and interrupting the regular N. E. trades is called the *kona.* On the W. side of the Crossfell range of hills in England are formed during easterly winds and previous to rains two peculiar clouds, from one to five miles apart, under which it is calm, while between them is felt a strong east wind locally known as the "helm wind of the Crossfell." 8. Our sketch of the winds would be imperfect without enumerating the remarkable areas of variable light winds and calms that constitute an important feature in terrestrial meteorology. These calms are sufficiently defined by their names: 1, the calms of the tropic of Capricorn; 2, the equatorial belt of calms, or the doldrums; 3, the calms of the tropic of Cancer, or the horse latitudes. 9. The explanation of the cause of the general system of terrestrial winds has been already given in METEOROLOGY. But besides the winds caused by differences of barometric pressure and of density, there are a few phenomena of occasional and minor importance, due to other causes; for instance, the gusts of wind that precede by a few minutes heavy local showers of rain and hail, result from the mechanical action of the falling drops, which communicate a part of their motion to the air; this, pressing down against the ground, is forced outward, so that on the edge of a rainy region the wind appears to blow from the rain. The existence of this wind complicates considerably the phenomena of local thunder storms, and has even misled some authorities into erroneous explanations of their origin and structure.—*Pressure of the Wind.* Owing to their great importance in relation to innumerable practical interests (such as the construction of windmills, the art of gunnery, the theory of the pendulum, the driving of railroad trains, and the sailing of vessels), the twin questions of the force of the wind and the resistance of air or water to moving bodies have been studied by very many eminent philosophers and experimenters. The results thus far obtained are almost entirely empirical. As regards the connection between pressure and velocity, the law announced by Newton, that the resistance should be as the square of the velocity of the moving body, is, for ordinary winds, sufficiently exact. The resistances or pressures vary directly as the density of the medium; they even vary slightly in the air for the ordinary ranges of the temperature and barometer; but they vary in a remarkable manner with every change in the form and the dimensions of the resisting body. The laws of the variation of the resistance as depending on velocities and forms and dimensions can only be satisfactorily given in the shape of an abstract of the numerical results deduced from each experiment. In general, it may be said that a concave surface exposed to the wind offers greater resistance than an equal sectional area of plane surface, and that a convex surface offers less resistance than a plane. The resistance offered by any body depends quite as much on the configuration of its hinder as of its front portions. The resistance offered by a plane surface which is not normal to the wind is less than when it is normal; and it diminishes in proportion to the cosine of the angle of incidence. For normal incidence the resistance is not to any great extent dependent on the nature of the surface, *i. e.*, whether it be rough or smooth. The determination by experiment of the actual pressure exerted by the wind is a very delicate matter. That which has been most widely adopted is known as the Smeaton or Rouse formula ("Philosophical Transactions," 1759), according to which the pressure in pounds avoirdupois on a surface of one square English foot is equal to 0·00492 multiplied by the square of the velocity expressed in miles per hour; the pressures calculated by this formula are given in the following table. A more trustworthy formula was deduced by Muncke (1842) from the observations of Borda, Hutton, and Woltmann, according to which the above constant coefficient should be 0·00499; but the difference between the two is insignificant in consideration of the extreme variations which depend on the size and shape of the resisting object. In very recent times this important subject has received further elucidation by both theoretical and experimental methods. (See the works of Stokes, Rankine, Thomson, Duchemin, Russell, Robinson, Saint-Venant, Cavallero, Dohrandt, &c.) Maxwell ("Proceedings of the Mathematical Society," 1870) has given theoretical formulas and curves showing the movements of the particles of an incompressible fluid streaming past a moving obstacle; while Hagen (Berlin, 1872) has experimentally investigated these motions. Helmholtz (Berlin *Monatsbericht*, 1873) has shown that for moderate velocities it is very approximately proper to consider the air as an incompressible fluid, free from friction. Finally, Thiesen (*Wind-Repertorium*, 1875) has made a careful theoretical study of the experiments of Hagen and Dohrandt, and established the rule that the pressure of the wind against an inclined rectangular plate is really very nearly proportional to the square of the velocity and the cosine of the angle of incidence of the wind, while the absolute value of the normal pressure is as given by Hagen's observations. The latter physicist (Berlin, 1874) has embodied the results of very careful observations at moderate velocities in a formula which, converted into English measures, is as follows: $P=(0{\cdot}0028934+0{\cdot}0001403p)Av^2$; where the velocity v is expresed in miles per hour, the area A of the surface is in square feet, the perimeter p of the surface in linear feet, and the resulting pressure P is in pounds avoirdupois per square foot. By introducing the term p Hagen has expressed the fact that the pressure depends to a considerable extent on the shape as well as the surface of the resisting body. The formula applies to plane surfaces placed normal to the incident wind, and assumes that the density of the air is that belonging to the barometric pressure, 29·84 in., and the temperature 59° F. For the resistance to shot at high velocities, see GUNNERY.

PRESSURE OF THE WIND.

VELOCITY.		PRESSURE PER SQUARE FOOT, POUNDS.			
			Hagen.		
Miles per hour.	Feet per second.	Rouse and Smeaton, per sq. foot.	Circular plates of one square foot.	Square plates of one square foot.	Triangular plates of one square foot.
1	1·47	0·005	0·003	0·003	0·004
2	2·93	0·020	0·014	0·014	0·014
3	4·40	0·044	0·030	0·031	0·032
4	5·87	0·079	0·054	0·055	0·057
5	7·33	0·123	0·085	0·086	0·088
10	14·67	0·492	0·339	0·345	0·353
15	22·00	1·107	0·763	0·777	0·795
20	29·34	1·968	1·356	1·382	1·413
25	39·67	3·075	2·119	2·159	2·208
30	44·01	4·429	3·052	3·109	3·180
35	51·34	6·027	4·154	4·232	4·328
40	58·68	7·873	5·425	5·527	5·653
45	66·01	9·963	6·866	6·996	7·155
50	73·35	12·300	8·476	8·637	8·838
60	88·02	17·715	12·208	12·437	12·719
80	117·36	31·490	21·701	22·110	22·613
100	146·70	49·200	33·908	34·546	35·332

WINDERMERE, an English lake, in Lancashire and Westmoreland, surrounded by gentle wooded eminences. It is about 11 m. long, and from a third of a mile to a mile wide, and its depth varies from 30 to 240 ft. Its outlet is the river Leven, discharging into Morecambe bay. It is abundantly stocked with fish.

WIND FLOWER. See ANEMONE.

WINDHAM. **I.** The S. E. county of Vermont, bordering on Massachusetts, and separated from New Hampshire by the Connecticut river; area, 780 sq. m.; pop. in 1870, 26,036. The surface is generally hilly, and in the W. part mountainous, and the soil is fertile. Granite of an excellent quality is very abundant. It is traversed by the Vermont Central and Connecticut River railroads. The chief productions in 1870 were 4,230 bushels of wheat, 185,675 of Indian corn, 163,122 of oats, 12,688 of barley, 353,836 of potatoes, 1,045,473 lbs. of butter, 92,095 of cheese, 233,772 of wool, 988,444 of maple sugar, 72,630 of tobacco, and 83,306 tons of hay. There were 4,818 horses, 6,685 milch cows, 13,266 other cattle, 42,440 sheep, and 3,946 swine. The whole number of manufactories was 278, having an aggregate capital of $1,413,452; value of products, $2,810,842. The most important were 2 of boots and shoes, 4 of children's carriages and sleds, 20 of carriages and wagons, 17 of furniture, 2 of hardware, 8 of machinery, 1 of organs, 2 of wrapping paper, 4 of woollens, 11 flour mills, 9 tanneries, 4 currying establishments, and 20 saw mills. Capital, Fayetteville. **II.** The N. E. county of Connecticut, bordering on Rhode Island and Massachusetts, and drained by the Quinebaug, Willimantic, Shetucket, and Natchaug rivers; area, 620 sq. m.; pop. in 1870, 38,518. The surface is very much broken, and the soil along the streams is highly fertile, but poor in other parts. It is intersected by the Norwich and Worcester, the Hartford, Providence, and Fishkill, the New London Northern, and the New York and New England railroads. The chief productions in 1870 were 16,094 bushels of rye, 161,414 of Indian corn, 167,574 of oats, 22,109 of buckwheat, 297,431 of potatoes, 517,509 lbs. of butter, 375,696 of cheese, 36,526 of wool, 5,685 of tobacco, and 58,734 tons of hay. There were 3,238 horses, 10,064 milch cows, 11,018 other cattle, 10,176 sheep, and 5,978 swine. The whole number of manufactories was 424, having an aggregate capital of $7,996,259; value of products, $11,028,056. The most important were 3 of acids, 13 of boots and shoes, 5 of bricks, 14 of carriages and wagons, 13 of clothing, 35 of cotton goods, 1 of glass ware, 2 of iron castings, 13 of machinery, 3 of paper, 3 of shoddy, 3 of sewing silk and twist, 14 of woollens, 24 flour mills, and 22 saw mills. Capital, Brooklyn.

WINDHAM, William, an English statesman, born in London, May 3, 1750, died there, June 3, 1810. He was educated at Eton, Glasgow, and Oxford, and began his political career by a speech at a meeting in Norwich in 1778, in which he denounced the war against the American colonies. He was a member of Dr. Johnson's literary club and a friend of Burke and Fox, and was returned to parliament for Norwich in the general election for 1784. In 1787 he was appointed one of the managers of the impeachment of Warren Hastings. He warmly advocated war with France, and was secretary at war in Pitt's cabinet from 1794 to 1801. In 1802 he vehemently denounced the peace of Amiens. He entered the Grenville administration in 1806 as secretary for the war and colonial departments, retired from office with his colleagues in 1807, and thenceforth remained in opposition. His eloquence was of a very high order, and Macaulay characterized him as "the finest gentleman of the age." His speeches have been published (3 vols., London, 1812), with a life prefixed. His diary was edited by Mrs. H. Baring in 1866.

WINDMILL, a building containing machinery driven by the action of wind upon a set of wings or sails. Windmills are of two kinds, one revolving in a vertical, the other in a horizontal plane. The principal parts of the machinery of a vertical windmill are: 1, an axis in the top of the building, inclined (as the impulse of the wind is very commonly exerted in a line descending at such an angle) to the horizontal at 10° or 15°, on which are the wings; 2, the wings, consisting of as many sail frames, with sails stretched on them, which, if four, are at right angles with each other, and that in all cases are mainly rectangular to the axis, their length being from 30 to 40 ft. each; 3, a large toothed wheel upon the horizontal axis already referred to, carried about with it by the action of the wind on the sails, and of course standing at the angle of 10° to 15° with the vertical, the teeth of which engage with those of a pinion upon—4, a truly vertical axis rising through the middle of the mill, and thus impart a movement of rotation to this, and (in case of grinding) to the upper millstone. The first named, or as it may be called horizontal axis, is supported at its innermost end near the centre of the base of a dome or cover surmounting the mill; while its opposite extremity is let through a perforation in one side of the dome, and projects far enough beyond to receive the ends of the long timbers, or "whips," to which the sails are affixed. The suddenly varying and often extreme pressure of the wind upon the wings renders it necessary that the supports of the horizontal axis, and all parts of the wings projecting from it, shall have great strength. Against the rim of the principal wheel upon this axis a brake can be brought to act, so as to stop the motion of the machinery. In the ordinary kind of wings, beginning at about six feet from the axis along each of the six whips, project on one or both sides of the whip a series of wooden pieces or staves, at right angles with the whip, usually growing shorter toward its extremity, and having their ends further joined by a continuous lath or strip of wood; the whole thus forms a sort of lattice, upon which the sail is to be stretched. The lattice and canvas are inclined to the line of the axis and of the wind at such an angle that, as in case of the obliquely set sails of vessels, the total force of the wind is resolved into components, a considerable one of which takes effect in the direction at right angles to the axis, and produces the revolution. But the different parts of the sail have not the same angle in respect to the line of the wind. The velocity of revolution of each wing increases from its inner to its outer end; and mathematical considerations show that the inclination of the sail to the wind should increase as the velocity increases, the best effect being obtained when at different lengths along the wing the inclinations are about those here named: at $\frac{1}{6}$ the length of the wing from the centre, 70°; at $\frac{1}{3}$, 71°; at $\frac{1}{2}$, 72°; at $\frac{2}{3}$, 74°; at $\frac{5}{6}$, 77$\frac{1}{2}$°; at the end, 83°. Other authorities give the inclinations from 60° to 80°. The result is that the surfaces of the sails are not oblique planes, but curving, or rather warped outward, in going from the centre to the extremities. Mr. Smeaton found that the velocity of the extremity of the sails is often to that of the wind in a ratio greater than that of 2 to 1; and according to Euler, when the velocity is that of 2 to 1, the efficiency of the mechanism is greatest. When the tower or mill is of timber and small, it is so fixed upon a strong column or axis entering its base, which is also sufficiently elevated, that the whole tower can be turned around so as to bring the axis of the machine in a line with the wind, by means of a long lever projecting from it below. In the case of stone and all large and heavy towers, the dome only is turned, carrying the axis and sails with it into the required position, while the vertical wheel merely travels about the pinion, and the connection is not broken. The turning of the dome to the wind is effected in different ways: 1, by the employment of a toothed wheel engaging in a rack on its inner side, and turned by means of a so-called endless cord, by a man below working a winch; 2, by a method invented by Sir W. Cubitt, consisting of a set of small vanes, placed in an upright position upon a long arm projecting in the same line with the horizontal axis, and by their revolution turning a shaft and pinion, and acting upon teeth surrounding the exterior of the dome and moving it; 3, by the much more simple and quite as effective means of having a single large vane extending behind the axis, and with its plane vertical, so that it, and consequently the axis, shall always be in the direction of the wind.—In situations in which the great height of the vertical sails would be objectionable, the horizontal windmill is sometimes used. It has six or more wings, usually of plain boards, set upright the whole height of the tower, being attached to upper and lower disks or platforms, and the whole is turned by the force of the wind about a vertical axis at its middle part. If the wings are fixed in position, they are set obliquely to the direction in which the wind will strike them. Outside of the whole is then placed a screen or cylindrical arrangement of boards not intended to revolve, these boards being also set obliquely and in planes lying in opposite course to those of the wings. The result is, that from whatever direction the wind may blow against the tower, it is always admitted by the outer boards to act on the wings most freely on that half of the side it strikes, on which the wings are turning away. But with an equal area of the wings, the power of the horizontal is always much less than that of the vertical windmill. Sir David Brewster concludes that the ratio is no less than that of 1 to 3 or 4.—Mr. Smeaton found that the efficiency of the sails is greater as they are broader at the extremity than near the centre, up to but not beyond a greatest breadth equal to one third the length of the wing; that if the total area of sails exceed seven eighths of the area of the circle described by the wings in their revolution, the velocity is diminished; that the maximum of work is obtained when the velocity of the wings as loaded with the work performed is to that they would have without load as 2 to 3; and that when the work is a maximum, the velocity of the sails still varies nearly with that of the wind. The variations in the pressure of the wind being considerable, and sometimes sudden and extreme, it becomes desirable to provide for regulating the sails accordingly; and a large share of the more recent inventions in connection with windmills have this for their object. The old plan is attended with much trouble and delay; in it the canvas, by means of a rope to each wing, can be taken in or let out, or that of each wing is made in three portions controlled by separate ropes; in either case, the mill must be stopped, and a man must usually ascend the wings successively for the purpose. One of the inventions in connection with the improvement of windmills was patented in 1861 by Mr. A. Giraudat of New York. In this, all necessity of a turning dome and horizontal axis is simply obviated, while in fact the wind wheel can be conveniently erected above the roof of any building, its axis descending through the roof to machinery within; and this machinery can be of almost any sort requiring moderate or ordinary power; for one important application of it, the running of sewing machines, a patent was obtained in July, 1862. The wind wheel is constructed simply with four or eight horizontal arms, on which solid square or oblong sails (rather tables) are carried, and by the revolution of which the vertical axis supporting them, and the machinery connected with it, are directly turned. The sails swing on the arms so as to be brought down perpendicular to a wind striking them on one side, and lifted toward a horizontal position, so as to prove ineffective when it strikes them on the other. For regulating the velocity, each sail can slide in from the end of its arm to near the axis; and it is caused to slide one way or the other by the action of a heavier and of a lighter weight on parts of a sort of endless cord attached to it, and both meanwhile upheld by means of iron links at the ends of the respective arms. If the impulse of the wind becomes excessive, the weights are by centrifugal force thrown outward, and the action draws the sail in toward the axis, where it can exert less effect, while the small weight slides up the link to allow of this; when the excessive impulse ceases, the heavier weight and link return to a more nearly vertical position, and the lighter weight, sliding down the link, returns the sail to the end of the arm.

WINDS, Vinds, or **Slovens** (Slav. *Sloventzi*), a Slavic people inhabiting chiefly the rural districts of the Illyrian provinces of Cisleithan Austria. They are also designated as southern Wends, in contradistinction to the Wends of northern Germany. (See WENDS.) They belong to the Illyro-Servian branch of the Slavs, and their number in Styria, Carinthia, Carniola, and the Littorale amounts to about 1,200,000, besides whom there are some Winds in southwestern Hungary and in Friuli, Italy. Their relation to the Veneti of the ancients is a matter of learned controversy. (See VENETIA.) About A. D. 600 they appear in their present abodes, in warfare with the dukes of Bavaria, and subsequently with the margraves of Friuli. In the 8th century they became subject to the Frankish empire, and their territory, then often designated as Corutania, was constituted by Charlemagne a borderland under the name of the Windish March. This was subsequently broken up and largely Germanized. The oldest remnants of Windish or more properly Slovenish literature, consisting of religious pieces, date from the 10th century. The reformation gave new life to the Slavic vernacular in these regions, which did not entirely cease with the extirpation of Protestantism, and a new literary revival began toward the close of the 18th century. This movement, which was subsequently fostered by Kopitar and other writers, has of late also assumed a political form, allying itself to similar agitations in Croatia and other Slavic parts of the Austrian empire, and increasing its internal complications.

WINDSOR, a S. E. county of Vermont, separated from New Hampshire by the Connecticut river; area, 900 sq. m.; pop. in 1870, 36,063. It is mountainous on the W. border and hilly in other parts, and the soil is fertile. Granite, limestone, and soapstone are abundant. The county is traversed by the Vermont Central and the Connecticut and Passumpsic Rivers railroads. The chief productions in 1870 were 36,901 bushels of wheat, 278,736 of Indian corn, 283,740 of oats, 39,823 of buckwheat, 439,416 of potatoes, 1,083,207 lbs. of butter, 602,818 of wool, 788,558 of maple sugar, and 111,511 tons of hay. There were 7,334 horses, 13,864 milch cows, 19,419 other cattle, 117,277 sheep, and 4,815 swine. The whole number of manufacturing establishments was 467, having an aggregate capital of $2,569,990; value of products, $3,759,271. The most important were 11 manufactories of agricultural implements, 17 of carriages and wagons, 2 of cotton goods, 13 of furniture, 4 of lime, 4 of machinery, 15 of saddlery and harness, 2 of shoe pegs, 2 of wooden ware, 12 of woollens, 1 blast furnace, 3 iron founderies, 12 flour mills, 8 tanneries, 6 currying establishments, and 30 saw mills. Capital, Woodstock.

WINDSOR, a town of Hartford co., Connecticut, on the W. bank of the Connecticut river, between Hartford and Windsor Locks; pop. in 1870, 2,783. The town was one of the first settled in Connecticut. William Holmes, one of the settlers of Plymouth colony, with several associates, in October, 1633, erected a building on the banks of the Connecticut, just below the mouth of its tributary the Tunxis or Farmington, and fortified it strongly with palisades. It was built for and occupied as a "trading house," until the arrival of permanent settlers from Massachusetts in 1636. The rich meadows, overflowed by the spring freshet, being at this point of considerable width and free from forests, were particularly valuable to the first settlers. The population is largely agricultural, but the town is rapidly filling up at the centre with the residences of artisans and others from Hartford.—WINDSOR LOCKS, on the Connecticut river, 12 m. above Hartford, and on the New York, New Haven, and Hartford railroad, was a part of Windsor till 1854, when it was incorporated as a separate town; pop. in 1870, 2,154. It is supplied with water power by the Enfield Falls canal, and is largely engaged in manufacturing, having several paper mills, stockinet, silk, and cotton factories, steel works, iron foundery, &c.

WINDSOR. I. A town and port of entry of Essex co., Ontario, Canada, on the Detroit river, opposite the city of Detroit, and at the W. terminus of the Great Western railway; pop. in 1871, 4,253. It contains several breweries and distilleries, and manufactories of tobacco, leather, brooms, wooden ware, soap and candles, boots and shoes, wine, carriages, &c. There are two branch banks, a high school, a daily and two weekly newspapers, a convent, and churches of four denominations. The value of imports for the year ending June 30, 1874, was $918,391; of exports, $271,826. **II.** A port of entry and the capital of Hants co., Nova Scotia, on an arm of Mines basin, and on the Windsor and Annapolis railway, 27 m. N. W. of Halifax; pop. in 1871, 2,715. There are extensive quarries of limestone, gypsum, and other valuable minerals in the vicinity. The streets are lighted with gas. It contains an iron foundery, several mills and factories, a branch bank, a weekly newspaper, and six churches, and is the seat of King's college. The value of imports for the year ending June 30, 1874, was $264,310; of exports, $127,294.

WINDSOR, or **New Windsor,** a municipal and parliamentary borough and parish of Berkshire, England, on the brow of a hill above the right bank of the Thames, 23 m. W. of London; pop. within the municipal limits in 1871, 11,769. An iron bridge across the

Thames connects Windsor with Eton. The town has a public ground, a handsome town hall, two churches, three dissenting chapels, two libraries, two hospitals, a dispensary and several other charitable endowments, charity and other schools, infantry barracks, and a theatre.—Windsor castle, the principal residence of the English monarchs, is E. of the town. The buildings cover 12 acres of ground, surrounded by a terrace on three sides 2,500 ft. in extent. They stand in the midst of the "Little park," about 4 m. in circumference, connected by a long avenue of trees S. of the castle with the "Great park," 18 m. in circuit, W. of which is Windsor forest, with a circuit of 56 m. Windsor was a residence of the Saxon kings before the Norman conquest, but the present castle was founded by William the Conqueror, and almost rebuilt by Edward III., under the direction of William of Wykeham, and again in 1824–'8, under that of Sir Jeffrey Wyatville. St. George's chapel is an excellent specimen of the florid style of Gothic architecture. In the royal vault connected with the chapel, Henry VI., Edward IV. and his queen, Henry VIII. and Jane Seymour, Charles I., George III. and his queen, George IV., the princess Charlotte, the duke of Kent, the duke of York, William IV. and his queen, and other members of the royal family are interred. In the keep or round tower of the castle, sometimes used for royal prisoners, James I. of Scotland was confined. In the state rooms and corridor are many choice paintings, groups of statuary, &c. Frogmore, the favorite residence of Queen Charlotte and afterward of the duchess of Kent, is ½ m. from Windsor.

Windsor Castle (Birdseye View).

WINDWARD ISLANDS. See West Indies.

WINE (Heb. *yain;* Gr. οἶνος; Lat. *vinum;* Fr. *vin;* Ger. *Wein*), originally and properly, the name of the liquor obtained by fermentation of the juice of grapes; but, in later and less strict usage, denoting also certain beverages prepared in a similar manner from the juices of many other fruits. Wine is mentioned as a familiar thing in the earliest books of the Old Testament. According to certain traditions, the vine (*vitis vinifera*) had its origin in India, and was thence disseminated to western Asia, to northern Africa, and to Europe. The earliest wines were doubtless obtained by mere expression and fermentation of the grape juice; but modifications in the way of increasing the saccharine element by partial drying of the grapes, and of aiding the development of alcohol by heat, began very early to be introduced. Among the Greeks and Romans certain leaves or aromatic substances were infused in the expressed grape juice, or "must," for their flavors; and additions were sometimes made of salt, and of turpentine or other resins. In other instances, in order to give body and flavor to certain wines, a portion of must concentrated by boiling was, as at the present day, added to the fermenting juice. The effect of age in maturing wines and heightening their quality was also early understood. Homer speaks of wine in its 11th year; Athenæus and Horace commend wines of greater age; and Pliny relates that he had drunk of that which was 200 years old, and which was thick and harsh. The inferior wines were often used directly from the casks in which they were fermented; others were drawn off for keeping into earthen jars or wooden vessels; while, at least in later times among the Romans, the finest sorts were kept in flasks of glass. In the countries of the East, wine appears to have been transported chiefly in bags made of goat skins, and commonly also to have been kept in bottles of like material. Homer names two wines as highly celebrated in his time among the Greeks: the Pramnian, from grapes grown near Smyrna, and a wine from Ismarus in Thrace, which he describes as "luscious, pure, a drink for gods." At a later period, Lesbos, Chios, Cyprus, and other localities in and about Greece, but especially the slopes of Mt. Tmolus in Lydia, furnished choice wines. Of Roman wines, the earliest noted was the Cæcuban, from near the site of the modern Fundi; and next, the Setinian, from the hills of Setia, above the Pontine marshes. The Falernian, however, so named from the district on the banks of the Volturnus in which it was produced, became the most celebrated of all the Roman wines; this was deemed fit for use only after the 10th year; its color was a very light amber, and its strength is intimated by the fact stated by Pliny, that it was the only wine known to him which upon the touch of a flame took fire. The Romans at this period regarded the wines of Italy as the finest in the world, the district most productive of them being the volcanic region of Campania, including Fundi and Sorrento. The wines of Germany and Gaul had not at this time attained to any celebrity abroad, though Gallia Narbonensis was already notorious for the manufacture of spurious compounds in imitation of wine; while to Spain Pliny credits rather abundance than choiceness of vintages, and the wines of Africa he pronounces generally acid and thin. In the reign of the Byzantine emperor Constantine VII. a compilation was made, in the "Geoponics," of all that had been written upon the vine from the 1st to the 4th century of our era. Scarcely one of the localities famous in Pliny's time for their superior wines produces at the present day a wine that is deservedly celebrated. The grape and wine making have in some degree extended to almost every portion of the earth in which the vine will flourish, including the islands of the Atlantic, Mexico, Australia, and parts of the United States and South America. (See GRAPE, and, for certain subjects directly related to the production of wine, ALCOHOL, BRANDY, DISTILLATION, FERMENTATION, TARTARIC ACID, and YEAST.)—The composition of grape juice varies not only with the variety of the vine, but among other circumstances also with the climate, the soil, the nature of the manures employed, the aspect and exposure of the vineyard, the character of the seasons, and the stage of partial or complete ripeness at which the gathering takes place. Besides water, which necessarily forms a large percentage of the juice, Mulder finds as its constituents sugar, gelatine or pectin, gum, fatty matter, wax, albumen, gluten, and tartaric acid, both free and combined with potash, soda, and lime; while generally, or in certain cases, small quantities also are present of racemic, malic, and perhaps citric acid, alumina, oxides of manganese and iron, sulphates of potash and soda, phosphate of lime and magnesia, and probably silica. Among peculiar constituents present in the skins are tannic acid and coloring matters; in the seeds, a fatty oil which can be separately extracted. The entire solid matters of the juice, the larger portion being sugar, may mount up in very ripe grapes to 40 per cent.; but most commonly the proportion is much less than this. The sugar is found to range from 13 to 30 per cent. of the weight of the juice. The vinous or alcoholic fermentation, that which is always first to occur in the grape juice, requires the presence of grape sugar dissolved in the water of the juice, as it naturally is; of a ferment, or substance capable of originating molecular change in the sugar; and of oxygen. (See FERMENTATION.) The beginning of fermentation in the grape juice, within a short period after it has been expressed, is shown by the rise through it of small bubbles of carbonic acid; and while the liquid becomes more turbid, as the bubbles ascend in greater quantity they form a froth upon its surface. Meanwhile the sugar of the juice diminishes, and alcohol takes its place; and the liquid gradually becomes more clear. Often this process continues for some months, the liquid being at intervals drawn off to free it of so much sediment as has fallen; when fermentation is completed, or in some instances a little before, it is transferred to casks to be stored, or at once exported. It has been found that the amount of ferment material is nearly or quite the same in the juice of all grapes, while it is well known that the quantities of sugar and of acids vary greatly. In those varieties of the grape in which (and this is the case particularly with those grown in the warmer climates) the sugar is present in very large proportions, the supply of ferment is exhausted before the sugar is all changed; and the portion of sugar thus left in the wine renders it sweet, as in the wines commonly known as sweet or "fruity," or as *vins de liqueur* (not artificial). Of such wines, Tokay, Frontignan, Constantia, and Malmsey are examples. The excess of sugar in a wine also acts commonly to preserve it against the acetous fermentation; so that muscadine wine has been kept for 200 years, and Tokay at the age of a century is in its perfection. But in grapes in which, as is common in the cooler vine-growing latitudes, the proportion of sugar is small, this may be wholly decomposed and replaced by alcohol by the time the ferment is exhausted, or even before. The wines then produced are characterized by the alcohol, acids, and flavor without sweetness, and are called "dry." Sherry is one of the best examples of this sort. In cases in which the sugar is exhausted before the ferment, the practice of adding to the fermenting must another portion which has been greatly concentrated by boiling is often resorted to for the purpose of supplying the deficiency; and a wine otherwise dry and acid may thus be converted into one that is sweet. But in the higher latitudes, and with the juices of other fruits than the grape, it has been more common to add to the must a quantity of sugar, especially of late years starch sugar; this may serve to consume all the ferment, generating of course more alcohol, and perhaps still leaving an excess of sugar; so that a wine thus treated is always stronger than otherwise, and may also be sweet. If, after the sugar is exhausted, there is still a portion of ferment remaining in the wine, or if fermentation is purposely arrested while such is the case, then this ferment is liable, and often for a long time, to set up the acetous fermentation, or change of the alcohol to vinegar, whenever the conditions favoring this change occur; these conditions are access of air to the wine, and the rather high temperature required to cause the action of oxygen upon the alcohol. Wine which begins in this way to acetify is said to be "pricked." The addition of more sugar in such case, often resorted to with a view of arresting this change, is very apt to hasten the decomposition. The preferable plan is to remove the wine immediately to a very cool place, as a cellar, and to leave it at rest for some time with limited access of air. Mulder calculates that 198 parts by weight of grape sugar, no loss being supposed, will give 92 parts of alcohol, or nearly in the proportion of one part of the latter to two of the former. But besides the varying percentage of sugar in the must, the facts that a portion of it may continue unchanged, and that during fermentation more alcohol than water is likely to evaporate, render it impracticable to predict in given cases what proportion of alcohol the wines produced shall contain. The exciting and intoxicating qualities of wines result, of course, from the presence and amount of the alcohol developed in them.—From such causes as the mixture of the perfect fruit with more or less that is unripe or decayed, the fluctuations of temperature that may attend the fermenting process, &c., wines even from the same variety of vine, and in different years from the same vintage, may be exceedingly dissimilar; and as a rule the composition of wines, even if pure, is far less subject to precise knowledge or determination beforehand than is that of the grape juice. While alcohol is forming, some of the components of the juice entirely or nearly disappear in the froth or sediment, and others are chemically changed, resulting in the production of new compounds. Since the juice of all grapes is colorless, it follows that when the expressed juice, separated wholly from the pulp and skins, is fermented alone, the wine will be perfectly colorless, or that known as "white," no matter what may have been the color of the grapes used. White wines will necessarily at the same time almost or wholly lack tannic acid, which is present in the skins. But if the crushed grapes and juice be left to ferment for a time together, however light the former, the liquid will acquire some color (at the least a tinge of amber); and the color will be deeper, to the very dark red of such wines as port, according as the skins of the grapes were of darker color, or as the time during which they remain in the fermenting juice is prolonged. Thus, natural color in wines is always that extracted from the skins of the grapes in the vat, and is not, as often supposed, due to the choice of purple grapes. But the presence of color will, for the like reason, always be attended with that of tannic acid, so that in some degree the colored wine will be rough or astringent; and the degree of astringency due to this cause will usually be proportional to the depth of color, a fact of which port wine also affords a marked instance. Alumina is said to be detected chiefly in the red wines, and in some of them also a trace of iron. The other free acids are such as named in stating the composition of the juice, tartaric being generally the most abundant; in soured wines, including those that have become musty or hurt with age, acetic acid is also present. Wines bottled while the process of fermentation is going on will also contain carbonic acid gas, and will in consequence, if drunk immediately on uncorking, have the quality of "briskness;" where the quantity of the gas is considerable, such wines sparkle when agitated in the light, and they are then distinguished as "sparkling," while those which do not sparkle are distinguished as "still." Wines always contain less of tartaric acid than the grape juice they are obtained from, owing to the circumstance that during the generation of alcohol the tartrates in the juice, and mainly the tartrate of potash, become insoluble and are thrown down; the considerable masses of nearly pure tartrate of potash thus found in the bottom of the vat or cask are an important source of that salt in commerce, and pass under the name of wine stone, crude tartar, or argol; the slight further deposition that may take place after bottling is known as "crust" or "beeswing." That quality in wines which in liquids generally would be known as flavor, must depend mainly in the former on the acids, sugar, and alcohol; but the fragrance and an important part of the actual flavor of wines are due to the presence of some peculiar volatile matter, the effect of which is technically distinguished from the simple flavor, and which is known as the perfume or *bouquet* of the wine. The nature of this odoriferous principle is not satisfactorily known. According to Fauré, it is a viscid substance diffused in the liquor, which he terms œnanthine. According to Liebig and to Winckler, it appears rather to be or to contain a peculiar ether, or a volatile fragrant acid; to the former the name of œnanthic ether has been given. Water is more abundant in wines made in wet seasons, and in the wine from new vineyards or young vines; of course also in wine from any grape in which the proportion of sugar is very small. Weak wines are more prone to become sour; and it was to avoid this result that the ancients resorted to various means of thickening their wines; the modern practice of increasing the strength by adding starch sugar, and if need be yeast also, is preferable in every way, unless the increased percentage of alcohol be considered the more objectionable result.—The quantity of alcohol in different wines, and in different vintages of those of the same kind, and also the modes by which it is to be ascertained, have received considerable attention from analytical chemists; but since the specific gravity of wines depends not merely, as in brandy or dilute alcohol, on the proportions of alcohol and water, but also on the other solid matters contained in them, no means have been devised less tedious than the actual distillation of the spirit from a portion of the wine, and the determining afterward of the proportion it must have formed in the whole. The analyses of the same wines by different chemists, naturally enough, afford considerable diversity of results; and remembering that no analysis can determine what the percentage of alcohol is to be in a wine to which brandy or spirit is added in variable quantities, or in any quantity by the importer and vender, the table furnished by Brande in 1811–'13 may still with little alteration be received as affording a fair indication of the average alcoholic strength of wines most commonly known; a few of these are given in the following table:

PERCENTAGE OF ALCOHOL IN WINES.

Lissa	25·41	Tinto (red French)	12·32
Port, maximum	23·92	Burgundy, maximum	12·32
" minimum	19·82	" minimum	11·00
Madeira, average	20·25	Graves (Bordeaux)	11·84
Constantia	18·29	Champagne, white	11·84
Lachrymæ Christi	18·24	" red	10·64
Sherry, maximum	18·37	Rhine wine, maximum	18·31
" minimum	17·00	" " minimum	8·00
Lisbon	17·45	Tokay	10·46
Hermitage, white	16·14	Nice	13·50
Malaga	15·98	Shiraz	14·40
Roussillon	15·96	Frontignan	11·80
Bordeaux (claret), max.	15·11	Malmsey	15·20
" " min.	11·95	Bucellas	17·10

The analyses of Christison assign lower proportions than the above for almost all wines, and especially the stronger, reckoning port, for example, at an average of about 16·2. Mulder, in summing up on the subject, says: "Port is the richest in alcohol, Madeira ranks next. Liqueur wines, as a rule, are stronger than red wines. Jurançon, Lachrymæ Christi, Benicarlo, and Sauterne contain from 12 to 15 of alcohol, or more. Red French wines contain less, from 9 to 14 per cent.; good Bordeaux, 9 to 11; champagne, 10 to 11; and Rhine wine, 6 to 12, generally 9 to 10 per cent."—The geographical range of the grape is very extensive. In the eastern hemisphere, excepting perhaps the colder eastern coast and central regions of Asia, it is from about lat. 54° N. to 45° S. The eastern portion of the American continent being also colder than its western shores, the limit of successful vine culture in the former is probably about lat. 45° N. As an illustration of the effect of climate and situation, the muscat grape matures on the Rhine only so far as to be fit for the table; while in the south of France it furnishes the rich Frontignan, Rivesaltes, and other sweet wines. So, the same variety of grape which on the Rhine yields the well known Hochheimer, near Lisbon affords the almost wholly different Bucellas, at the Cape the Cape hock, and formerly yielded at Madeira the delicious Sercial, neither of which latter bears any distinct resemblance to the true Rhenish. Meyen declares that grapes of the same variety, if cultivated at different elevations upon the side of a mountain, yield essentially different wines. It is not latitude, but the course of the isothermal lines, that so far as temperature is concerned determines the fitness of the grape for wine making; but even within the same belt of equal temperatures, the predominance of cloudiness and humidity of the air is the condition, next to cold, the most unfavorable to the perfecting of the grape, as that of a generally clear sky and dry air is the most favorable. Thus, with the same latitude and a nearly similar temperature, good wines are produced on the Rhine between Coblentz and Düsseldorf, though from the grapes of Belgium and the south of England they cannot be had. But the influence of judicious cultivation and manufacture is doubtless among the most efficient of all. The celebrated Johannisberger wine is produced upon an elevation of 150 ft. above the Rhine and the country adjacent; but the Johannisberg estate and a few other estates near it belong to large proprietors, who bestow upon their business an amount of care and skill far exceeding that shown as a rule by the owners of the small surrounding vineyards; the result is a very great superiority in the wines produced by the former. The soils on which the best grapes grow are rather light and porous, and of the composition called calcareous. But it must not be forgotten that, as the grape contains considerable tartrate of potash, this base must be present in a more or less soluble condition. What are called feldspar soils, when of good physical character, are favorable for grape culture. Certain peculiar strong-smelling substances in the soil are likely to impart their unpleasant odor to the wine it produces, an example of which occurs in some lands in Germany in which the *Stinkstein* (a variety of subcarbonate of lime) is present. The vine growers of France and Portugal are strongly averse to manuring their vines; and in the port district of the Alto Douro the practice is forbidden by law. But the German cultivators manure very freely, with no ill effect upon the quality of the wines, which in fact are generally esteemed for their bouquet. The manuring is practised every third or fourth, or up to the tenth year; fresh cow dung is used in some instances, but oftener strips of woollen previously soaked in liquid manure and dried; and the practice is more common with the red than the white grapes. Among the best of manures are the cuttings of the vine, applied as often as they are pruned, since these restore to the soil a portion of the alkalies abstracted by the vine and so necessary to the fruit. (See AMERICAN WINES, and the articles on the wines of Europe under the names of the different countries.)—Wines are obtained from the currant, gooseberry, raspberry, blackberry, and elderberry; and also from other parts of certain plants, as from the root of the parsnip and beet, the stem of the birch and cocoa palm, the leaves of the grape vine, and the spathe or sheath of the *sagus vinifera* and other palms.—See Jullien, *Topographie de tous les vignobles connus* (Paris, 1824, translated into English; new French ed., 1871); Redding, "History and Description of Modern Wines" (London, 1851), and "French Wines and Vineyards" (1860); Mulder, *Chemie des Weins* (Leipsic, 1856; translated by H. Bence Jones, London, 1859); Haraszthy, "Grape Culture, Wines, and Wine Making" (New York, 1862); Shaw, "The Wine and its Cellar" (London, 1864); Mohr, *Der Weinstock und der Wein* (Coblentz, 1864); Sheen, "Wines and other fermented Liquors, from the Earliest Ages to the present Time" (London, 1864); Husmann, "Cultivation of the Native Grape and Manufacture of American Wines" (New York, 1866); Pasteur, *Le chauffage du vin* (Paris, 1867); Heckler, *Weinbaulehre* (Frankfort, 1868); Guyot, *Études des vignobles de France* (Paris, 1868); Thudicum and Dupré, "Treatise on the Nature and Varieties of Wine" (London, 1872); Druitt, "Report on Cheap Wines" (London, 1873); and Vizetelly, "The Wines of the World Characterized and Classified" (London, 1875).

WINEBRENNER, John, an American clergyman, born in Frederick co., Md., March 25, 1797, died in Harrisburg, Pa., Sept. 12, 1860. He was originally a minister of the German Reformed church, having charge of four congregations in and near Harrisburg, Pa.; but owing to a difference of views in regard to revivals, he withdrew from that body, and in October, 1830, established a new denomination, called by him the church of God, but commonly known as Winebrennerians. They hold that there are three positive ordinances of perpetual standing: baptism by immersion, the washing of feet, and the Lord's supper. Baptism, however, is not a necessity preceding church fellowship, faith in Christ being the door into the church. Feet washing is obligatory upon all Christians. This rite, as practised by the Winebrennerians, Dunkers, Mennonites, and some others, is based by its adherents upon the example and words of Jesus in John xiii.: "If I then, your Lord and master, have washed your feet, ye ought to wash one another's feet. For I have given you an example that ye should do as I have done to you. If ye know these things, happy are ye if ye do them." The Lord's supper should be frequently administered, to Christians only, in a sitting posture, and always in the evening. Fast days, experience meetings, anxious meetings, and camp meetings are all approved. The Winebrennerians have always been opposed to slavery and to the making and vending of ardent spirits. The government of the church consists of the local council in each congregation, district elderships or presbyteries meeting annually, and the general eldership, which meets triennially. The ministers are appointed to their stations by a committee of the annual elderships, which also holds the property (meeting houses, parsonages, &c.) of each society. They have a foreign and domestic missionary society, a book depository, and a printing establishment at Harrisburg, where a weekly paper, "The Church Advocate," and a Sunday school paper, "The Gem," are published. In 1873 there were 13 elderships and about 600 churches, 400 ministers, and 40,000 members. Mr. Winebrenner was for several years editor of the "Church Advocate," and in 1844, in connection with I. D. Rupp, published "The History of all the Religious Denominations in the United States." He also published a work on "Regeneration," a "Brief View of the Church of God," "The Reference and Pronouncing Testament," "Revival Hymn Book" (English and German), "The Seraphina" (a music book), a volume of "Practical and Doctrinal Sermons," and the "Church Hymn Book."

WINES, Enoch Cobb, an American philanthropist, born in Hanover, N. J., Feb. 17, 1806. He graduated at Middlebury college in 1827, and taught school in St. Albans, Vt., Alexandria, Va., and Washington, D. C., in 1829 became teacher on board the United States ship Constellation, then taught in Princeton, N. J., Philadelphia, and Burlington, N. J. In 1849 he was ordained pastor of the Congregational church at Cornwall, Vt., and in 1850 became pastor of the church at Easthampton, L. I. In 1854 he was appointed professor of ancient languages in Washington college, Pa., and in 1859 president of the city university of St. Louis. Since 1862, when he was appointed secretary of the New York prison association, he has been actively engaged in prison reform. Through his efforts a national prison association was formed at Cincinnati in 1870, of which he became secretary. In 1871 he went to Europe as a representative of the United States government to make arrangements for an international penitentiary congress, which met in London July 4, 1872, composed of representatives of 26 governments. It appointed a permanent international commission, of which Dr. Wines was chosen chairman, and which met at Brussels in 1874 and at Bruchsal in 1875, and has called a second international congress to meet at Stockholm in 1877. Besides several volumes of reports of the transactions of these bodies, and one on the prisons and reformatories of the United States and Canada, he has published "Two Years and a Half in the American Navy" (2 vols., Philadelphia, 1832), "Commentaries on the Laws of the Ancient Hebrews" (New York, 1852), "Adam and Christ" (1858), &c.

WINKELRIED, Arnold Struth von, a Swiss patriot, whose heroism decided the battle of Sempach, July 9, 1386, in which a large Austrian army was engaged against only 1,300 Swiss. The latter had failed to penetrate the enemy's line, when Winkelried, grasping all the Austrian pikes within his reach, buried them in his body and bore them to the earth, while over him his companions rushed into the opening and defeated the Austrians with terrible slaughter. A monument to him was erected at Stanz, canton of Unterwalden, in 1865.—See Liebenau, *Arnold Winkelried, seine Zeit und seine That* (Aarau, 1862), and Kleissner, *Die Quellen zur Sempacher Schlacht und die Winkelried-Sage* (Göttingen, 1873).

WINKIN DE WORDE. See WORDE, WYNKIN DE.

WINLOCK, Joseph, an American astronomer, born in Shelbyville, Ky., Feb. 6, 1826, died in Cambridge, Mass., June 11, 1875. He graduated at Shelby college, Ky., in 1845, and became professor of mathematics and astronomy there. In 1852 he removed to Cambridge, and became one of the computers of the "Nautical Almanac." In 1857 he was appointed professor of mathematics in the United States navy, and served at the naval observatory in Washington and the naval academy in Annapolis. In 1865 he became director of the observatory of Harvard college, and Phillips professor of astronomy. Besides his observatory work, he was twice director of expeditions to observe solar eclipses: that to Kentucky in August, 1869, and that to Spain in December, 1870. He made many improvements in the equipment of the observatory, which have since been adopted throughout the world. He died suddenly of apoplexy.

WINN, a N. parish of Louisiana, bounded W. by Saline bayou and S. E. by Little river, and intersected by the Dugdemona; area, about 1,000 sq. m.; pop. in 1870, 4,954, of whom 909 were colored; in 1875, 5,355, of whom 997 were colored. The surface is generally level and the soil fertile. There are numerous small lakes and ponds. The chief productions in 1870 were 87,540 bushels of Indian corn, 18,022 of sweet potatoes, 14,161 lbs. of butter, 3,576 of wool, 1,562 of rice, 1,482 of tobacco, and 2,680 bales of cotton. There were 985 horses, 6,940 cattle, 2,354 sheep, and 15,724 swine. Capital, Winfield.

WINNEBAGO. I. A N. county of Illinois, bordering on Wisconsin, and drained by Rock and Pecatonica rivers; area, 508 sq. m.; pop. in 1870, 29,301. The surface is mostly prairie and the soil is fertile. It has railroad communication with Chicago. The chief productions in 1870 were 411,074 bushels of wheat, 137,985 of rye, 1,237,406 of Indian corn, 868,903 of oats, 75,018 of barley, 266,272 of potatoes, 95,194 lbs. of wool, 640,827 of butter, 27,317 of cheese, and 33,010 tons of hay. There were 10,116 horses, 1,023 milch cows, 16,124 other cattle, 24,767 sheep, and 19,354 swine; 10 manufactories of agricultural implements, 8 of carriages and wagons, 3 of men's clothing, 2 of cotton goods, 5 of iron castings, 2 of machinery, 4 of paper, 4 of sash, doors, and blinds, and 12 flour mills. Capital, Rockford. **II.** An E. county of Wisconsin, bounded E. by Lake Winnebago, and drained by Fox and Wolf rivers; area, about 450 sq. m.; pop. in 1870, 37,279; in 1875, 45,033. The surface is level and the soil fertile. It has railroad communication with Milwaukee. The chief productions in 1870 were 745,512 bushels of wheat, 190,397 of Indian corn, 364,143 of oats, 87,366 of potatoes, 175,020 lbs. of hops, 135,648 of wool, 721,265 of butter, 99,387 of cheese, and 47,294 tons of hay. There were 6,103 horses, 7,911 milch cows, 7,797 other cattle, 37,507 sheep, and 7,822 swine; 4 manufactories of boots and shoes, 19 of carriages and wagons, 7 of furniture, 2 of hubs and wagon material, 6 of iron castings, 5 of machinery, 2 of matches, 1 of printing paper, 4 of sash, doors, and blinds, 1 of wooden ware, 2 of woollens, 21 flour mills, 2 tanneries, 3 currying establishments, 8 breweries, 7 planing mills, and 49 saw mills. Capital, Oshkosh. **III.** A N. county of Iowa, bordering on Minnesota; area, 432 sq. m.; pop. in 1870, 1,562. The surface consists of rolling prairies, and the soil is fertile. The chief productions in 1870 were 23,914 bushels of wheat, 8,040 of Indian corn, 12,545 of oats, 17,305 lbs. of butter, and 3,351 tons of hay. There were 236 horses, 1,059 cattle, 518 sheep, and 411 swine. Capital, Forest City.

WINNEBAGO, a lake of Wisconsin, the largest within the limits of the state, occupying parts of Calumet, Fond du Lac, and Winnebago counties. Its length is 28 m. N. and S., greatest width about 10 m.; area, about 212 sq. m. Its depth is variable, and it is navigable in most parts. Fond du Lac, Oshkosh, and other towns are on its shores, and there is water communication to Green bay and Lake Michigan by the Fox river, which is improved by dams and locks. A wall of rocks extends along the E. border for 15 m., reaching in some places hundreds of feet below the surface.

WINNEBAGOES, a tribe of the Dakota family of North American Indians, calling themselves Hochungara, but styled by the Sioux Hotanke or Sturgeon; by the Hurons and Iroquois, Awentsiwaen; and by the Algonquins, Wennibegouk. The last term, meaning men from the fetid or salt water, was translated by the French Puants. With the Quappas and Tuteloes they apparently formed the van of the eastward Dakota migration, and were forced back to Green bay. They were then numerous and formidable, and ruled by terror over the neighboring Algonquin tribes. Soon after the French began to trade with the west, in the early part of the 17th century, a general alliance of tribes attacked the Winnebagoes. They were driven into one town, where want and disease reduced them greatly, and 500 warriors perished. The Illinois, wishing to relieve them, were treated with cruelty, and in retaliation nearly exterminated them, but the women and children were spared; and the Winnebagoes became a small tribe, but still haughty and turbulent. They were faithful to the French, and served them in war, receiving protection in return. They sided with the English during the revolution, and were active in the Miami war, taking part in the attack on Fort Recovery in 1793. They made peace after being defeated by Wayne. They adhered to Tecumseh, and during the war of 1812 sided with England, aiding to reduce Prairie du Chien in 1814. They were then estimated at 4,500. In 1820 they had 5 villages on Winnebago lake and 14 on Rock river. They made a treaty of peace and friendship, June 3, 1816, but levied tribute on all whites who passed up Fox river; and English annuities kept up a bad feeling. Treaties in 1826 and 1827 fixed their boundaries, but their land contained rich mines, which some of the Indians began to work and refused to sell. White intrusion led to murders, for which Red Bird and others were seized, tried, and convicted. In 1829, for $30,000 in goods and a 30-year annuity of $18,000, they under Heretshonsarp ceded land from the Wisconsin to Rock river. The Winnebago prophet supported the Sacs in their hostility, and projects were formed for their removal. The treaty of Fort Armstrong (September, 1832) ceded all their land south of the Wisconsin and Fox river, 2,530,000 acres, the United States agreeing to give them a reservation on the Mississippi above the upper Iowa, pay $10,000 for 27 years, maintain schools, &c. They became unsettled and wasteful, and in 1837 made provision for a debt of $150,000 by ceding more land. In 1842 there were 756 at Turkey river, Iowa, their new home, with as many in Wisconsin, and smaller bands elsewhere. All had become lawless and roving. By the treaty of Washington in 1846, they surrendered their former reservation for 800,000 acres north of the St. Peters and $195,000. The site to which they were removed, above the Wataub west of the upper Mississippi, was not that promised, and was utterly unfit. They lost by disease and want, but were kept there by force. In 1853 they were removed to Crow river. Here schools were revived and attempts made to improve them; but by the treaty of Feb. 27, 1856, they were again moved to Blue Earth, Minnesota. Here they began to cultivate, houses were built, a school was well attended, and by a treaty in 1859 the land was to be allotted, 80 acres to a family, 40 to a single man. Several had taken up plots when the Sioux war broke out, and the people of Minnesota demanded the removal of the Winnebagoes. They were disarmed in April, 1863, and removed to Crow creek, Dakota, on the Missouri above Fort Randall. The place was utterly unsuited to them, affording no means of livelihood and surrounded by wild Indians. Although troops tried to keep them there, deaths were so numerous from hostile Indians, famine, and disease, that 1,222 out of 1,985 who had been removed succeeded in reaching the Omaha reservation, where they appealed for shelter. In May, 1866, they were removed to Winnebago, Nebraska, where all had to be begun again. In 1869 they were assigned to the care of the Friends. The next year the agent deposed their chiefs and installed 12 of his own selection. Chiefs are now elected. Lands were again allotted to such as wished to take up farms, and in 1874 they numbered in Nebraska 1,445, with farms, cottages, and stock, dressed like whites, and had three schools. On their removal from Minnesota 160, chiefly half-breeds, who had taken up land, remained, and these received each as his share of tribal funds $800; but many have lost this and the land and joined the tribe in Nebraska. The Winnebagoes left in Juneau, Adams, and Wood counties, Wisconsin, were self-supporting. They numbered nearly 1,000. In the winter of 1873–'4 most of these were removed to Nebraska, a smaller tract near the Winnebago reservation of 128,000 acres being purchased for them; but most of them left almost as soon as they reached it. Besides the early Catholic missions, later attempts were made by Catholics and Presbyterians, with very little permanent result.

WINNESHIEK, a N. E. county of Iowa, bordering on Minnesota, and intersected by Upper Iowa and Turkey rivers; area, 720 sq. m.; pop. in 1870, 23,570. The surface is rolling, diversified by prairies and woodland, and the soil is fertile. The Milwaukee and St. Paul railroad traverses it. The chief productions in 1870 were 700,191 bushels of Indian corn, 822,400 of oats, 99,095 of barley, 77,525 of potatoes, 810,126 lbs. of butter, 42,233 of wool, and 42,246 tons of hay. There were 6,782 horses, 8,715 milch cows, 11,638 other cattle, 11,373 sheep, and 17,337 swine; 2 manufactories of agricultural implements, 9 of carriages and wagons, 1 of iron castings, 2 of machinery, 7 flour mills, 5 breweries, 4 saw mills, and 3 woollen mills. Capital, Decorah.

WINNIPEG, a city, port of entry, and the capital of the province of Manitoba, Canada, on the W. bank of Red river and the N. bank of the Assiniboin, at their confluence, 50 m. by the course of the former above Lake Winnipeg, and 90 m. below the United States boundary, nearly 400 m. (direct) N. N. W. of St. Paul, Minn.; lat. 49° 52′ N., lon. 96° 58′ W.; pop. in 1875, about 7,000. It covers an area of 3 sq. m. The streets are well graded and provided with sidewalks. Water works and a system of sewerage are projected. The chief public buildings are the governor's residence, court house, city hall, post office, custom house, Merchants' bank, Ontario bank, Dominion land office, and Hudson Bay company's office, which with many warehouses are large and elegant structures of white brick manufactured in the neighborhood. Opposite, on the E. bank of the Red river, is St. Boniface, the residence of the Roman Catholic archbishop, which has a fine stone cathedral. Winnipeg is the headquarters of the Dominion bureaus relating to the Northwest territories, and in America of the Hudson Bay company. It has a healthful climate, the air being dry and bracing. The heat, though not oppressive, is sometimes great in summer, and the cold extreme in winter. The city communicates with the United States by steamboat or stage to Moorhead, Minn., on the Red river, and thence by rail to Duluth or St. Paul. It is also reached from the province of Ontario by way of Fort William on Lake Superior, and thence by the "Dawson route," about 480 m., across the chain of portages. A line of railroad is in course of construction along the E. bank of the Red river to the junction of the Northern Pacific and St. Paul and Pacific railroads at Glyndon, Minn. This line is expected to be completed in 1876. The Canadian Pacific railroad, under construction E. from Winnipeg, is expected to reach Lake Superior in 1877. The trade of the city is important, and consists chiefly in jobbing to the traders on the plains of the Saskatchewan, Bow, Mackenzie, and Peace rivers, and in furnishing supplies to government survey, exploration, and railroad construction parties, and to the new settlements and arriving immigrants. The exports consist chiefly of furs. The imports from all sources for the year ending June 30, 1874, amounted to $2,662,442; the exports of furs in August, 1874, to $146,780. The assessed value of property in 1874 was $2,675,768, upon which the city charter allows a levy of only one per cent. There are good common schools, a young ladies' school, and four colleges (Episcopal, Presbyterian, Roman Catholic, and Wesleyan). A daily and four weekly (one French) newspapers are published. There are Baptist, Episcopal, Presbyterian, Roman Catholic, and two Wesleyan churches.—The place was formerly known as Fort Garry, taking its name from the Hudson Bay company's post established here more than half a century ago, and the post office name is still Fort Garry. It was the chief centre of the Indian and Hudson Bay company's trade. A new impulse was received with its occupation by troops in the autumn of 1870, after the suppression of Riel's rebellion (see MANITOBA), when its population was less than 300. It was incorporated as a city in November, 1873, with about 2,500 inhabitants.

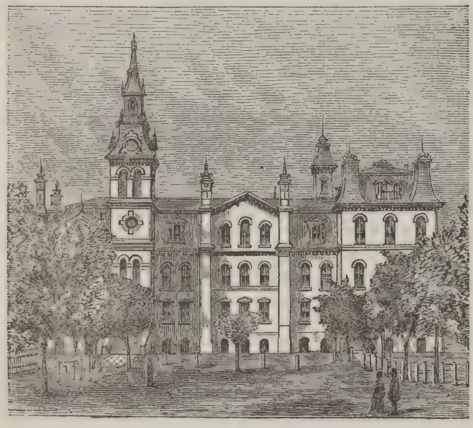
WINNIPEG. **I.** A lake of British North America, between lat. 50° 20′ and 54° N., and lon. 96° and 99° W. It is of irregular shape, being about 260 m. in length from N. N. W. to S. S. E., and from 6 to 60 m. wide; area, about 8,500 sq. m.; length of coast line, about 930 m. It is 628 ft. above the level of the sea, and does not exceed 12 fathoms in depth. It contains many islands. Ice forms to a thickness frequently of 5 ft., and does not leave the upper part of the lake before the 10th of June. Through its tributaries it receives the drainage of an immense extent of territory, the area of its basin being estimated at 400,000 sq. m. Berens river enters on the east, the Winnipeg on the southeast, Red river on the south, Dauphin river (which discharges the waters of Manitoba and Winnipegosis lakes) on the west, and the Saskatchewan on the northwest. It receives no affluents from the north, but at this point discharges its waters through Nelson river into Hudson bay. The name Winnipeg in Algonquin signifies "dirty water." **II.** A river, having its source in the lake of the Woods, on the border of Minnesota and British America, and flowing N. W. into Lake Winnipeg. Its length is 165 m. It contains numerous rapids, having a total fall of 349 ft., and is only navigable by canoes and barges. At one point it is called White river from the continuous foaming of the rapids. It discharges the waters of the chain of lakes along the international boundary, its remote sources being in the height of land separating the affluents of Lake Superior from those of Hudson bay.

WINNIPEGOSIS, or **Winnipegoos** (Little Winnipeg), a lake of British North America, N. W. of Lake Manitoba, into which it discharges through Water Hen river. It is about 125 m. long from N. to S. and 25 m. in greatest breadth; area, about 2,000 sq. m. It is 20 ft. above Lake Manitoba and 60 ft. above Lake Winnipeg, and is navigable by vessels drawing 10 ft. of water. On the southwest it receives the waters of Dauphin lake, and on the northwest Swan and Red Deer rivers.

WINNIPISEOGEE, Winnipesockee, or **Winnipesaukee,** a lake of New Hampshire, lying between Carroll and Belknap counties. Its extreme length is nearly 25 m., its greatest breadth about 10 m., and its altitude above the sea 472 ft. Its form is very irregular, and it is studded with islands. There are several bays. Its waters are very pure and of great depth. Its outlet is the rapid river of the same name, which unites with the Pemigewasset to form the Merrimack. It is abundantly stocked with fish. Steamers ply upon the lake in summer.

WINONA, a S. E. county of Minnesota, bordering on the Mississippi river, which separates it from Wisconsin, and drained by Whitewater river and several smaller streams; area, 638 sq. m.; pop. in 1870, 22,319; in 1875, 27,385. It has a level surface, consisting mostly of rolling prairie diversified by woodlands. The soil is highly fertile. It is intersected by the Winona and St. Peter and the Milwaukee and St. Paul railroads. The chief productions in 1870 were 1,357,954 bushels of wheat, 273,477 of Indian corn, 598,871 of oats, 64,311 of barley, 79,074 of potatoes, 478,425 lbs. of butter, 10,615 of wool, and 16,944 tons of hay. There were 5,478 horses, 5,167 milch cows, 6,380 other cattle, 3,287 sheep, and 6,278 swine; 3 manufactories of agricultural implements, 6 of bricks, 13 of carriages and wagons, 2 of iron castings, 1 of lightning rods, 6 of sash, doors, and blinds, 13 flour mills, 4 breweries, 4 planing mills, 5 saw mills, and 2 railroad repair shops.

WINONA, a city and the county seat of Winona co., Minnesota, the third city in size in the state, on the W. bank of the Mississippi river, 96 m. S. E. of St. Paul; pop. in 1855, 813; in 1860, 2,464; in 1870, 7,192; in 1875, 10,737. It is on a level prairie, surrounded by lofty bluffs, and has wide streets. The business portion is compactly built of brick and stone. The Winona and St. Peter, the St. Paul and Chicago, the Chicago and Northwestern, and the Green Bay and Minnesota railroads meet here. It is one of the most important lumber distributing points on the upper Mississippi, the sales in 1875 amounting to about $1,400,000. As a grain-shipping point it ranks among the first in the northwest, the shipments of wheat having increased from 1,203,161 bushels in 1862 to 3,159,716 in 1870, and to 5,890,645 in 1875. The manufactories include three large saw mills, five sash and door factories, six flouring mills, two founderies, several factories of agricultural implements, six of carriages, one of blank books, one of confectionery and vinegar, one of crackers, four of barrels, and a tannery. There are four national banks and a savings institution. The assessed value of property in 1875 was $4,852,594, about 60 per cent. of the real value. The city has excellent public schools. The high school building cost $55,000. The first state normal school has a fine building costing $145,000. There are a daily and three weekly newspapers and 14 churches.—Winona was settled in 1851, laid out as a town in 1852, and chartered as a city in 1857.



First State Normal School.

WINSLOW, Edward, governor of Plymouth colony, born at Droitwich, Worcestershire, England, Oct. 19, 1595, died at sea, May 8, 1655. He joined the church of the Rev. John Robinson at Leyden in 1617, was a passenger in the Mayflower, and in the first conference with Massasoit offered himself as a hostage, and won the attachment of the Indian chief, which he increased in 1623 by curing him of a severe illness. In 1623–'4 he made two voyages to Europe as agent for the colony. He was chosen its governor in 1633, 1636, and 1644. In 1635 he visited England again as agent for the colony, and Archbishop Laud imprisoned him for 17 weeks on the charges of teaching in the church, being a layman, and performing marriage as a magistrate. In 1649 he went to England again, and aided in forming the society for propagating the gospel in New England. In 1655 Cromwell appointed him one of three commissioners to superintend an expedition against the Spaniards in the West Indies, but he died before its completion. He was the author of several works, of which "Good Newes from New England" (London, 1624), "Hypocrisie Unmasked" (1646), and "The Glorious Progress of the Gospell among the Indians" (1649) have been republished in the collections of the Massachusetts historical society (vols. viii., 1st series, ix., 2d series, ii., 3d series, and iv., 3d series).

WINSLOW, Forbes Benignus, an English physician, born in London in August, 1810, died there, March 3, 1874. He commenced his professional studies in New York, passed the royal college of surgeons, London, in 1835, and graduated M. D. at Aberdeen. He devoted himself exclusively to the treatment of insanity from 1840, and opened a private asylum at Hammersmith, of which he was resident superintendent for several years till his large consultation practice called him to London. In 1848 he established the "Quarterly Journal of Psychological Medicine and Mental Pathology." In 1851–'2 he was Lettsomian lecturer to the medical society of London. In 1857 he was made president of the association of the medical officers of hospitals and asylums for the insane, and in 1859 a commissioner of lunacy. Between 1831 and 1835 he published a "Manual of Osteology," a "Manual of Practical Midwifery," and "Physics and Physicians;" afterward, "The Anatomy of Suicide" (1840); "Preservation of Health of Body and Mind" (1842); "Plea of Insanity in Criminal Cases" (1843); "Act for the Cure and Treatment of Lunatics" (1845); "Lettsomian Lectures on Insanity" (1854); "Obscure Diseases of the Brain and Disorders of the Mind" (1860); and "Light: its Influence on Life and Health" (1867).

WINSLOW, Jacques Bénigne, a French anatomist, born in Odense, Denmark, in 1669, died in Paris in 1760. He studied medicine and settled in Paris, where he became lecturer at the *jardin du roi* (afterward the *jardin des plantes*). His name is given to the "foramen of Winslow," an opening or passage behind the right-hand edge of the gastro-splenic omentum, by which the general cavity of the peritoneum communicates with a posterior cavity included between the stomach and transverse colon.

His principal work is *Exposition anatomique de la structure du corps humain* (Paris, 1732), which was translated into many languages.

WINSLOW, John A., an American naval officer, born in Wilmington, N. C., Nov. 19, 1811, died in Boston, Sept. 29, 1873. He was appointed midshipman in 1827, and commissioned as lieutenant in 1839. He distinguished himself in the Mexican war, and became commander in 1855. In 1861–'2 he was attached to the Mississippi flotilla, and was commissioned captain July 16, 1862. In 1863–'4 he commanded the steam sloop Kearsarge, in which on June 19, 1864, off Cherbourg, France, he encountered and sunk the confederate cruiser Alabama, commanded by Raphael Semmes. For this achievement he was promoted to the grade of commodore. He was subsequently in command of the gulf squadron, of the Pacific fleet, and of the navy yard at Portsmouth, N. H. He became rear admiral in 1870.

WINSLOW. I. Miron, an American missionary, born in Williston, Vt., Dec. 11, 1789, died at the Cape of Good Hope, Oct. 22, 1864. He graduated at Middlebury college in 1815, and sailed in June, 1819, as missionary to India. After laboring 17 years in Ceylon, he founded a mission at Madras, and was president of the native college which he founded in 1840. He prepared a complete "Dictionary of the Tamil and English Languages" (Madras, 1862), and also published a "History of Missions" (1819), "Memoir of Mrs. Harriet L. Winslow" (1838), and "Hints on Missions to India" (1856). **II. Hubbard,** an American clergyman, brother of the preceding, born in Williston, Vt., Oct. 30, 1800, died there, Aug. 13, 1864. He graduated at Yale college in 1825, studied theology there, and became pastor of the Congregational church in Dover, N. H., in 1828, and of the Bowdoin street Congregational church, Boston, in 1832. From 1844 to 1853 he was principal of the Mount Vernon seminary for young ladies in Boston. In 1858–'9 he preached to the first Presbyterian church in Geneva, N. Y., and in 1861 to the 50th street Presbyterian church in New York. He published "Controversial Theology" (1832); "Doctrine of the Trinity" (1834); "Christianity applied to our Civil and Social Relations" (1835); "Appropriate Sphere of Woman" (1837); "Woman as She Should Be" (1837); "Relation of the Natural Sciences to Revelation" (1839); "Christian Doctrines" (1844); "Intellectual Philosophy" (1851); "Moral Philosophy" (1856); and "The Hidden Life" (1862).

WINSTON. I. A N. county of Alabama, watered by tributaries of the Black Warrior river; area, about 900 sq. m.; pop. in 1870, 4,155, of whom 21 were colored. The surface is a rolling table land; the soil is fertile. The chief productions in 1870 were 3,278 bushels of wheat, 94,165 of Indian corn, 16,157 of sweet potatoes, 205 bales of cotton, and 42,759 lbs. of butter. There were 708 horses, 1,798 milch cows, 1,063 working oxen, 2,326 other cattle, 3,550 sheep, and 10,985 swine. Capital, Houston. **II.** An E. central county of Mississippi, drained by the head streams of Pearl river; area, 720 sq. m.; pop. in 1870, 8,984, of whom 3,403 were colored. The surface is generally undulating and the soil fertile. The chief productions in 1870 were 4,734 bushels of wheat, 151,238 of Indian corn, 7,959 of oats, 19,100 of sweet potatoes, 38,248 lbs. of butter, 4,937 of rice, and 1,964 bales of cotton. There were 975 horses, 1,986 milch cows, 3,691 other cattle, 4,218 sheep, and 10,753 swine. Capital, Louisville.

WINTER, the coldest season of the year, which begins astronomically on the shortest day, Dec. 22, and ends with the vernal equinox, March 21. But in the United States the winter months are popularly reckoned December, January, and February, and in England November, December, and January. The countries lying in and bordering upon the torrid zone have no winter in the popular sense of the word, but in place of it a rainy season. In the southern hemisphere the winter months are June, July, and August according to the American method, which takes as the central month that in which the sun passes the solstice, and July, August, and September according to the English method, which reckons from the month next following that passage.

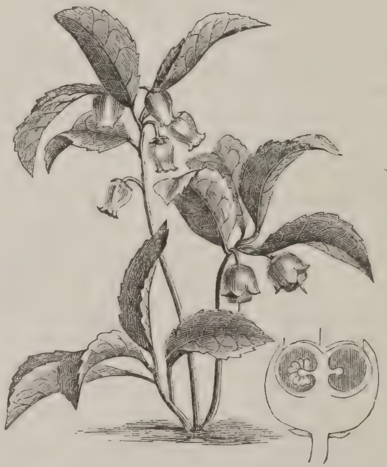
WINTER, Peter von, a German composer, born in Mannheim in 1755, died in Munich, Oct. 17, 1825. At 10 years of age he became a violinist in the orchestra of the elector, and in 1776 director of the orchestra of the German opera at Mannheim. It was not until his 40th year that he produced any really effective works. He composed more than 50 operas and a great number of masses, symphonies, and miscellaneous pieces. His maturer works, including the operas *Calypso*, *Proserpina*, *Zaïra*, *Tamerlan*, and *Der Sänger und der Schneider*, are esteemed his best. He was eminent as a teacher of vocal music, and his *Gesangschule* (Mentz, 1824) is still esteemed.

WINTERBERRY. Several native deciduous shrubs, with fruit and flowers much like those of the holly, were formerly placed in the genus *prinos* (the Greek name for the holly); but later botanists make them only a subgenus of the holly (*ilex*), from which they differ mainly in their deciduous leaves and smooth nutlets. The most common and conspicuous winterberry (*ilex verticillata*) is also called black alder. It is usually 5 or 6, rarely 10 or 12 ft. high, with oval, obovate, or wedge-lanceolate serrate leaves, downy below, but they are not (nor are the flowers) whorled, as the specific name would imply; the flowers are mostly diœcious, the staminate in small axillary clusters four- to six-parted, the pistillate solitary, often five- to nine-parted, and succeeded by a solitary bright scarlet berry the size of a large pea. This is common on the edges of moist grounds, where its brilliant berries in autumn and early winter make it very conspicuous;

the color of the fruit is remarkably intense, and where the shrub grows, as it sometimes does, in large patches, it makes a blaze of scarlet unequalled in our winter landscape. It is cultivated in Europe, but rarely in this country. The bark and berries are bitter, and are used as a domestic tonic. The smooth winterberry (*I. lævigata*), common near the coast from Maine to Virginia, has smoother and narrower leaves, the sterile flowers on a long peduncle, and larger, less brilliant berries, which ripen earlier than the preceding. There are a few other related species, some with purple fruit; but these are much less common.

Winterberry (Ilex verticillata).

WINTERGREEN, one of the popular names for *Gaultheria procumbens*, a low, aromatic, evergreen shrub of the heath family, found in damp woods, especially under the shade of evergreens, in Canada and the northern states, and along the mountains to North Carolina. The long slender stems creep extensively upon or just below the surface, from which rise the flowering branches, 3 to 5 in. high, bearing a few leaves, each with one or two nodding flowers in its axil; the leaves are oval or obovate, obscurely toothed, of a leathery texture, dark green, shining above and lighter below; the cylindrical or somewhat urn-shaped corolla has five teeth at the orifice, and is pearly white; stamens ten, the anthers with two appendages at the summit; the ovary five-celled, ripening into a depressed, five-lobed, five-celled, many-seeded, dry capsule. As the fruit ripens the calyx increases greatly, becomes thick and fleshy, finally surrounding and nearly enclosing the proper fruit, and appearing like a bright scarlet berry. The flowers appear in May and July; the berries, which ripen in autumn, remain until spring; they have a slight aromatic taste; they are often seen in the city markets, where they are called checkerberries; they form an important part of the food of partridges and other birds which hibernate in the northern states. The leaves and stems are strongly aromatic, with a flavor and odor like that of the black birch (*betula lenta*), due to a volatile oil, which is separated by distillation and is known in commerce as oil of wintergreen; it is the heaviest of the essential oils, having the specific gravity 1·173, and boils at 412° F.; it is a salicylate of the oxide of methyle, and has been prepared artificially. The oil is used for flavoring confectionery and to cover the taste of medicines; the plant itself is astringent as well as aromatic, and an infusion is sometimes used in diarrhœa, and also as a substitute for tea. The plant has a number of common names, and as some of these are also applied to other plants, there is much confusion; besides wintergreen, it is in different parts of the country called boxberry, teaberry, mountain tea, partridge berry, checkerberry, deerberry, and ivory plum, the last name having reference to the fruit. (See PARTRIDGE BERRY.)—Another species, *Gaultheria shallon*, is abundant in Oregon and other parts of the northwest, especially in dense evergreen woods; it is from 18 in. to 3 ft. high, with glossy, ovate, somewhat heart-shaped leaves, with reddish-tinged flowers in racemes, and abundant purple fruit; it is the salal berry of the Indians, who as well as the whites use the fruit for food. It succeeds in England, where it is planted to furnish shelter and food for game, but it is difficult to cultivate it in the eastern states.


Wintergreen (Gaultheria procumbens), with Section of Fruit.

WINTERHALTER, Franz Xaver, a German painter, born at Mengenschwand, Baden, April 20, 1806, died in July, 1873. He studied engraving at Freiburg and painting at Munich. In 1828 he became known at Carlsruhe by his portraits of the grand duke and grand duchess of Baden. After perfecting his art in Italy, he settled in 1834 in Paris, where he spent most of his life. He was the most fashionable portrait painter of his day. Many of his pieces have been engraved. Among the best known are Queen Victoria, Prince Albert, and the prince of Wales, a group of the same family at Windsor castle, and one of the empress Eugénie and eight ladies of her court at St. Cloud. His other productions comprise "Dolce far niente," "The Decamerone," "Neapolitan Women," "The Girl of Ariccia," "The Siesta," and (one of the finest of them all) "Roderick the Goth seeing Florinda for the First Time."

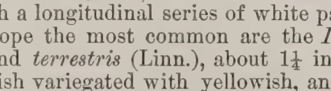
WINTERTHUR, a town of Switzerland, on the Eulach, in the canton and 16 m. N. E. of the city of Zürich; pop. in 1870, 9,404. It is surrounded by walks and vineyards, and is one of the most attractive and prosperous of Swiss towns. It has several notable churches and a new town hall, a public library and museum, and a gymnasium. In the vicinity are cotton factories and iron and machinery works.

WINTHROP. I. John, governor of the colony of Massachusetts, born in Groton, county of Suffolk, England, Jan. 11, 1588, died in Boston, Mass., March 26, 1649. He was bred to the law. When in 1629 a charter was obtained creating a corporation under the name of the "Governor and Company of the Massachusetts Bay in New England," Winthrop was elected governor, and sailed from Yarmouth, April 7, 1630, with about 900 persons. On the voyage he composed "A Modell of Christian Charity" (published in the collections of the Massachusetts historical society, 3d series, vol. vii.). On June 12 he arrived at Salem, and the government was transferred to him by Endicott. He was reëlected every year till 1634. In 1636, when Sir Henry Vane was elected governor, Winthrop was chosen deputy governor, and during this and the following year occurred the celebrated controversy in regard to Mrs. Hutchinson and her doctrines. Vane and Winthrop were on opposite sides, and in the election of 1637 the latter was chosen governor. He was reëlected every year till 1640, and again in 1642 and 1643. He was deputy governor in 1644 and 1645, and again governor from 1646 till his death. Winthrop was opposed to an unlimited democracy, but conscientiously attached to civil liberty. He kept a journal of the transactions in the colony down to 1649. The first two books were first published in 1790, and the manuscript of the third was found in 1816 in the New England library kept in the tower of the Old South church. The three were published in a revised edition, with notes by James Savage (2 vols. 8vo, Boston, 1825–'6; corrected ed., 1853). His "Life and Letters" were edited by R. C. Winthrop (8vo, Boston, 1864; new ed., 1867). **II. John,** governor of Connecticut, son of the preceding, born in Groton, England, Feb. 12, 1606, died in Boston, Mass., April 5, 1676. He was educated at Trinity college, Dublin, was in the expedition of 1627 for the relief of the Huguenots of La Rochelle, was attached to the embassy to Turkey in 1628, followed his father to America in 1631, and was chosen a magistrate of Massachusetts, but soon returned to England. In 1635 he came back with a commission from the company formed under the Warwick grant or old patent of Connecticut, and built a fort at the mouth of the Connecticut river, of which plantation he was constituted governor. In 1645 he founded what is now the city of New London. He was elected a magistrate of Connecticut in 1651, governor of the colony in 1657, deputy governor in 1658, and governor again from 1659 till his death. In 1661 he procured from Charles II. a charter which united Connecticut and New Haven into one colony. In 1676 he represented Connecticut in a congress of the united colonies at Boston, and was there seized with his last illness. He was one of the founders of the royal society of London, and the author of a number of papers in the "Philosophical Transactions." **III. John,** an American scholar, a descendant of Governor Winthrop of Massachusetts, born in Boston, Dec. 19, 1714, died in Cambridge, May 3, 1779. He graduated at Harvard college in 1732, and from 1738 till his death was Hollis professor of mathematics and natural philosophy in that institution. In 1740 he observed the transit of Mercury, of which he furnished very accurate notes, and in 1761 went to Newfoundland to observe the transit of Venus. He published a lecture on earthquakes (1755), two lectures on comets (1759), and other tracts on astronomical subjects. The degree of LL. D. was conferred upon him by the university of Edinburgh in 1771. **IV. Robert Charles,** an American statesman, a descendant in the sixth generation of the first Governor Winthrop, born in Boston, May 12, 1809. He graduated at Harvard college in 1828, studied law in the office of Daniel Webster, and was admitted to the bar in 1831, but soon withdrew from practice. From 1835 to 1840 he was a member of the legislature, and in 1838–'40 was speaker. In 1840–'42 and in 1843–'50 he was a member of congress, and was speaker in 1847–'8. In 1850 he was appointed United States senator for the remainder of Mr. Webster's term, and he was an unsuccessful candidate for that office before the legislature in 1851. In the same year he was the whig candidate for governor, and received the largest number of votes, but not the majority then required to elect. He is president of the Massachusetts historical society and of other literary and charitable associations. Besides editing the "Life and Letters of John Winthrop," he has published a "Memoir of Nathan Appleton" (Boston, 1861); his own more important addresses, lectures, orations, and speeches in congress (2 vols. 8vo, 1853–'67); and "Washington, Bowdoin, and Franklin, with a few brief Pieces on kindred Topics" (1876).

WINTHROP, Theodore, an American author, born in New Haven, Conn., Sept. 22, 1828, killed in the engagement of Great Bethel, Va., June 10, 1861. He graduated at Yale college in 1848, entered a New York counting house, spent two years at Panama, and accompanied Lieut. Strain's expedition to the isthmus of Darien. He began the practice of law in St. Louis, but soon removed to New York. In April, 1861, he went with the seventh regiment to Washington, and became military secretary to Gen. Butler, with the rank of major. He was shot dead while leading the assault on the left of the confederate line at Great Bethel. His works, all published posthumously, are: "Cecil Dreeme" (1861); "John Brent," "Edwin Brothertoft," and "Canoe and Saddle" (1862); and "Life in the Open Air" (1863). A new edition of them was commenced in 1876.

WIRE, a small metallic rod or thread, varying in thickness from half an inch to $\frac{1}{5000}$ of an inch. The facility with which a metal may be drawn into wire is called its ductility. (See DUCTILITY.) From an examination of the history of wire drawing, Beckmann is led to conclude that in early times metals were brought to the filamentous form only by beating into thin plates, then dividing these into narrow strips, and finally rounding with the hammer and file. Such a view agrees with the account given in Exod. xxxix. of the sacerdotal dress, and with that of the fable of Vulcan's forging a net of delicate wirework with which to ensnare Mars and Venus. The earliest known mention of "wire drawers" and "wire millers," as those who produced wire by drawing were variously called, occurs in 1351 and 1360, in the histories respectively of Augsburg and Nuremberg, the previous accounts being only of "wire smiths," or those who fabricated wire with the hammer. The change from the old to the new method was accomplished, or very soon followed, by the introduction of a machine, probably the invention of one Ludolf of Nuremberg, by which wire was produced without direct aid of the hand. The precious metals appear to have been the first subjected to this process. White wire, or blanch iron wire, is in fact mentioned in a list of articles not to be imported into England in 1463; and in 1484 both iron and latten (fine brass) wire are similarly named. Anderson, however, records that up to 1565 English iron wire was drawn by hand only, and was so poor that most of that used in the country, and also wool cards and other articles involving the employment of wire, were imported; and that in the year named patents were granted to certain Dutchmen or Germans to manufacture wire in England. In 1630 this manufacture is spoken of as employing many thousand persons, and producing a superior article; and the importation of foreign wire, wool cards, and hooks and eyes, of the last named of which (made from wire) a very large amount was already consumed, was again formally prohibited. In the 17th century the business of wire drawing became largely established about Barnsley in Yorkshire; while the manufacture of copper and brass wire also was begun (1649) by foreigners at Esher.—For wire, the best and toughest wrought iron is selected. Formerly this was prepared for drawing by hammering it out into convenient rods of nearly a half inch thickness. These rods were then extended and further reduced by a sort of coarse drawing, called ripping or rumpling, by means of a machine, believed to be also the invention of Ludolf, in which a pair of pincers were made to advance to the draw-plate, seize the protruding end of the rod, and then, being moved back and drawing the metal thus far, to relax their hold, advance again to the plate, and repeat the process. Owing to the interrupted action, the use of this machine involved loss of time, while a degree of unevenness in the product, and the marks left by the pincers, rendered it unsuitable for the manufacture of small wire or that of the best quality. Until recently, however, and especially on the continent of Europe, iron wire was drawn altogether by such a machine. At present, iron, and usually steel, are prepared for the final drawing by passing between grooved rollers very accurately made and adjusted, of 7 or 8 in. diameter, and sometimes making 350 revolutions to the minute. The cast-steel wire for the best needles and some similar articles is prepared for drawing with the hammer, in preference to submitting it to the rolling process. But however the metal may be prepared, and in whatever manner the drawing may be performed, this latter operation is in all cases essentially the same in principle. Very commonly the draw-plate is a piece of hardened or shear steel, about 6 in. long and 1½ in. thick, flattened on one side and slightly tapered toward the ends. From the flat side of this plate, at which they have their larger extremity, to the opposite side, several conical holes are pierced, their smaller orifices being carefully finished to the sizes they are respectively intended to give to the wire drawn through them. As the holes necessarily become enlarged by long use, when this occurs the smaller orifices are reduced by hammering, and then opened to the proper size again by means of a long taper needle, called a pritchell. The French draw-plates, it appears, are formed by repeatedly fusing and hammering, to insure their complete union, the two lateral parts of a compound bar, one part being of wrought iron, the other part of a sort of steel, called *potin*, previously obtained by melting to a paste fragments of cast-iron pots with white-wood charcoal, throwing this into cold water, and repeating the melting and sudden cooling 10 or 12 times. When the union of the two parts is complete, the plate is reheated and extended; and it is then several times heated and punched with successively smaller punches, to secure tapering holes; though these, which are of course smallest at the steel or hardest side, are left to be finished in the cold plate by the wire drawer himself. The orifices should be made successively smaller by almost imperceptible gradations, so that the reduction of the wire and the effort required shall be at the successive drawings as nearly uniform as possible.—Whether wire is drawn by machinery or by hand, after a few drawings, and less in number as its size is smaller, it so far becomes brittle under the process as to be in danger of snapping off, or at least as to impair its quality and strength; and it requires to be annealed. (See ANNEALING.) The wire is then scoured or washed to free it from oxide; immersion for a time in starch water or in stale beer grounds is found to favor this result. At a wire manufactory some years since, some ingots of brass were heated and quenched in the slightly acid liquor employed for cleaning the annealed wire, as a ready means of warming the liquor; this wire was found to pass with unusual ease through the draw-plate; and an examination showed that the acidulated liquor had deposited over the wire (by galvanic action) a delicate film of copper, which appeared then to play the part of lubricant to the iron. This has led to the employment ever since in that factory of a weak solution of a copper salt in the cleaning liquor, the copper film being wholly removed in connection with the last annealing. With most descriptions of wire, grease also is commonly and freely used, and with the finer sizes wax, for lubrication. —Mr. Brockedon in 1819 patented the use in fine draw-plates of the hardest precious stones. With a plate having a hole pierced through a ruby, of 0·0033 in. in diameter, a silver wire 170 m. long has been drawn so nearly uniform that neither the micrometer nor the weighing of equal lengths at the two ends showed any difference in the size. In 1813 Dr. Wollaston communicated to the royal society a method devised by him for preparing wires of extreme tenuity, for use in place of the "spider lines" in the telescope. He drilled holes lengthwise through small rods of silver, cast into these cores of gold, drew the compound bars, and then removed the silver by an acid. Subsequently he drew platinum wire, say to $\frac{1}{100}$ inch diameter, and cast about this a cylinder of silver, such that the platinum should be $\frac{1}{20}$ the diameter of the compound rod; this rod, $\frac{1}{5}$ in. in diameter, is then drawn to a wire so fine that, the two metals (as in case of the gold and silver above) perfectly maintaining their relative diameters throughout the process, the removal of the silver by nitric acid leaves a platinum wire of far less size than could be attained by drawing the metal singly, which has been brought, it is said, to a thickness of only $\frac{1}{30,000}$ of an inch. Of such wire, a mile's length would weigh but a grain, and 150 filaments in close contact would barely equal the size of an ordinary filament of raw silk. Actual gold wire being in use for a few purposes only, among them that of making filigree work, that which is commonly known as "gold wire" is really silver gilt; and the mode of making this quite as strikingly exemplifies the extreme ductility of the precious metals. A silver rod an inch in diameter is covered with leaf gold, and by drawing and annealing this rod is then reduced to the finest wire required; and though in the outset but 100 to 140 grains of gold are thus allowed to a pound of silver, the wire produced is still completely coated. Such wire is wound upon thread to form gold thread, the economy as well as beauty of the product being increased by previously flattening the wire between polished steel rollers. Brass wire also is made so fine, even by the ordinary processes, that gauze may be woven from it which shall have 67,000 meshes to the square inch.—Wire is applied to a great variety of uses, among which is that of the manufacture of wire gauze or cloth. Beckmann refers to some very intricate and curious old specimens of wire network. The plainer sorts of wire gauze or network are woven on looms differing but little from those for cloth. Those of large wire and open meshes are employed for fences, large cages or buildings of wire for birds or small animals, and for coarse riddles or sieves, &c.; the finer sorts are put to use in the construction of sieves, lanterns, flour-dressing machines, paper-making machinery, screens for windows, safety lamps, &c. By pressing sheets of wire gauze in moulds, the shape of which they retain, and finishing off their edges with hoops or rings, these are formed into dish covers, baskets, &c. The wire in bird cages, fenders, and other like articles is often specially plaited or woven in forming them, so that, as in the case of the making of baskets, they admit of a great variety of construction and ornamentation. Knitting and sewing needles and pins are at first cut from wire expressly prepared for such manufacture, and some of the finest sorts of steel wire are consumed in making the hair springs of timepieces. A very important use of steel wire is its application in the way of the so-called "strings" of pianos. Spangles, or paillettes, which are small flat disks of metal with an opening in the centre, and used for ornamenting garments, are formed of wire, by twisting this spirally round a rod, cutting so as to obtain as many single coils or rings, and then flattening these with a hammer upon a smooth anvil. Gold and silver wires are much used in the production of filigree work. (See FILIGREE.) Wire is also used in making "wire concrete." This is done by stretching on a metal framework a system of wires or wire cordage, and enclosing it in concrete. Doors and shelves can be formed in this way, and it is proposed to utilize the invention in the construction of sea walls.—For the making of wire into wire rope, and in reference to the comparative strength and some of the uses of such rope, see BRIDGE, and ROPE; and for the use of wire in telegraph lines, see TELEGRAPH. Brass wire is used in large quantities for the manufacture of pins and of hooks and eyes; also for binding the handles of brooms. Copper and sometimes iron wire is used for the same purposes. Wire is also often used in the manufacture of fences. Its chief advantage is that sections or panels of fence may be formed in framework, which may be joined and fastened together in such lengths as occasion may require, and readily moved.

WIRE WORM, a name applied to the myriapod animals of the genus *iulus* (Latr.), to the larvæ of several of the spring beetles, and to the caterpillars of many owlet moths of the family *agrotididæ*, the last more properly called cut-worms. (See CUT-WORM.) The characters of the order of myriapods have been sufficiently given under CENTIPEDE. The genus *iulus* may be taken as the type of the subdivision *chilognatha*, popularly called millepedes from the great number of feet. The body is long and cylindrical, consisting of numerous horny, arched segments, most bearing two pairs of feet ending in small single hooks, the last having none; antennæ short and seven-jointed; jaws rudimentary, suited for feeding on soft or decaying vegetable substances instead of the living prey of the chilopod centipedes. Their movements are very slow and worm-like; when in danger the body is rolled into a spiral ball; they undergo a kind of metamorphosis, having at first only three pairs of feet, and attain their full growth only after several moultings extending over a period of two years, showing an affinity to the insects proper; the reproductive season in Europe is from December till about the middle of May; they lay a great number of eggs in the ground. They are common in damp earth and moss, and sometimes on or under the bark of trees; they are harmless, and actually beneficial in warm climates by consuming decomposing vegetable substances; they have been considered injurious to vegetation in temperate regions, probably erroneously. The Canada wire worm (*I. Canadensis*, Newport), so common in Canada and about the falls of Niagara, is 1½ in. long, with 43 smooth shining segments; it is reddish flesh-colored, with black lateral spots beneath a longitudinal series of white patches. In Europe the most common are the *I. sabulosus* and *terrestris* (Linn.), about 1¼ in. long, brownish variegated with yellowish, and with about 120 legs on a side. The largest species is the *I. maximus* (Linn.), 6 or 7 in. long, and a native of woods and retired places in South America. — The larvæ of the spring beetles (*elater*, Linn.) are called wire worms from their slenderness and hardness; they are said to live in the larva state five years, during most of which time they feed on the roots of wheat, rye, oats, and grass, causing sometimes nearly a total destruction of the crop; they are especially injurious in gardens recently converted from pasture lands. The best known European wire worm is the *elater* (*agriotes*) *segetis* (Bierk.), the *cataphagus lineatus* (Steph.) according to some entomologists being the same; the larva when full-grown is about seven lines long, very narrow, yellowish, hard and shining, with 12 segments, the last two indented with dark specks, head brown, and end of jaws black; it is very destructive to grain and culinary vegetables. The *E.* (*agriotes*) *mancus* (Say) is about ½ in. long, stout, dark brown covered with dirty yellowish gray hairs, and punctured thickly above; from April to June numbers may be seen among the roots of grass and on rails and fences; the larvæ have six legs on the first three segments, and beneath the tail a short retractile wart or prop-leg.



Canada Wire Worm (Iulus Canadensis).

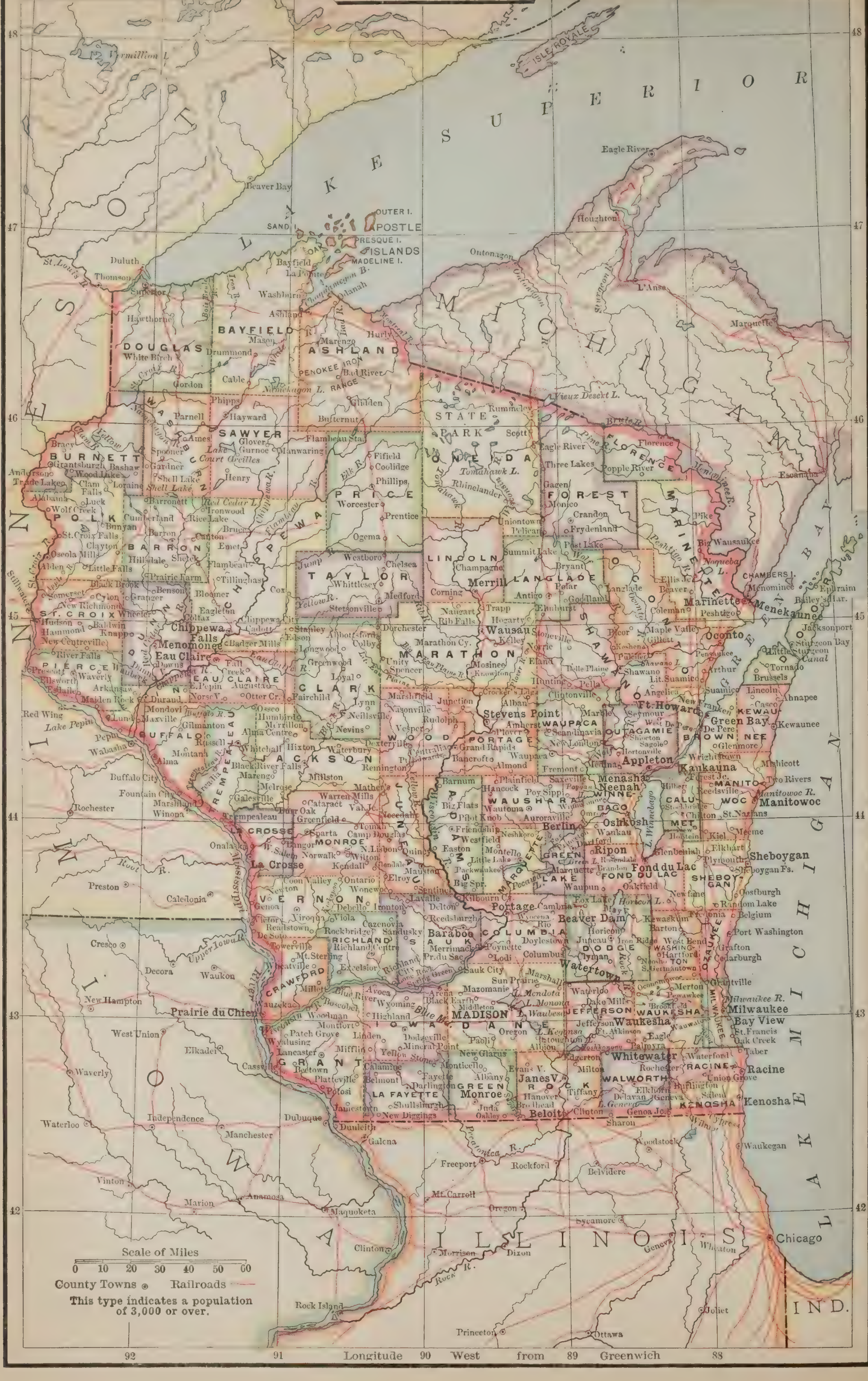
WIRT, a W. central county of West Virginia, bounded N. by Hughes river, and intersected by the Little Kanawha; area, 298 sq. m.; pop. in 1870, 4,804, of whom 29 were colored. The surface is very hilly and the soil generally fertile. Iron ore and bituminous coal are abundant. The chief productions in 1870 were 15,532 bushels of wheat, 128,836 of Indian corn, 37,988 of oats, 17,809 of potatoes, 44,000 lbs. of butter, 8,712 of tobacco, and 1,527 tons of hay. There were 954 horses, 954 milch cows, 1,259 other cattle, 4,183 sheep, and 3,700 swine. Capital, Wirt Court House.

WIRT, William, an American lawyer, born in Bladensburg, Md., Nov. 8, 1772, died in Washington, D. C., Feb. 18, 1834. He was admitted to the bar in 1792, and commenced practice at Culpeper Court House, Va., but in 1795 settled in Charlottesville. In 1799 he removed to Richmond, was elected clerk of the house of delegates, and in 1802 was appointed chancellor of the Eastern Shore of Virginia, but soon resigned to return to the bar at Norfolk. In 1803 he published in the "Virginia Argus" his "Letters of a British Spy," consisting principally of sketches of prominent public orators (10th ed., with a memoir, 12mo, New York, 1832). In 1804 he published in the "Richmond Enquirer" a series of essays under the title of "The Rainbow." He settled in Richmond in 1806, and represented that city in the Virginia house of delegates in 1807–'8. In the prosecution of Aaron Burr he was retained to assist the United States attorney. In 1816 he was appointed attorney of the United States for the district of Virginia, and from 1817 to 1829 he was attorney general of the United States, settling in Baltimore on his retirement. In 1832 he was the candidate of the anti-masonic party for president of the United States. His best known work is his "Sketches of the Life and Character of Patrick Henry" (1817; 15th ed., Hartford, 1852). His life has been written by J. P. Kennedy (2 vols. 8vo, Philadelphia, 1849).

WIRTEMBERG. See WÜRTEMBERG.

WISBY, Laws of. See LAW MERCHANT, vol. x., p. 219.

WISCONSIN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LAKE SUPERIOR
ISLE ROYALE
Eagle River
Houghton
Ontonagon
L'Anse
Marquette
Escanaba
MICHIGAN
MINNESOTA
IOWA
ILLINOIS
IND.
LAKE MICHIGAN
GREEN BAY
Beaver Bay
Vermillion L.
Duluth
Thomson
Superior
St. Louis R.
OUTER I.
SAND I.
APOSTLE ISLANDS
PRESQUE I.
MADELINE I.
Bayfield
La Pointe
Chequamegon B.
Washburn
Ashland
DOUGLAS
BAYFIELD
ASHLAND
PENOKEE IRON RANGE
WASHBURN
SAWYER
BURNETT
POLK
BARRON
ST. CROIX
PIERCE
DUNN
CHIPPEWA
EAU CLAIRE
PEPIN
BUFFALO
TREMPEALEAU
JACKSON
CLARK
TAYLOR
PRICE
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STATE PARK
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FLORENCE
MARINETTE
OCONTO
LANGLADE
SHAWANO
MARATHON
WOOD
PORTAGE
WAUPACA
OUTAGAMIE
BROWN
KEWAUNEE
DOOR
MANITOWOC
CALUMET
WINNEBAGO
WAUSHARA
ADAMS
JUNEAU
MONROE
LA CROSSE
VERNON
RICHLAND
SAUK
COLUMBIA
MARQUETTE
GREEN LAKE
FOND DU LAC
SHEBOYGAN
DODGE
WASHINGTON
OZAUKEE
CRAWFORD
GRANT
IOWA
DANE
JEFFERSON
WAUKESHA
MILWAUKEE
LA FAYETTE
GREEN
ROCK
WALWORTH
RACINE
KENOSHA
Chippewa Falls
Menomonee
Eau Claire
Merrill
Wausau
Stevens Point
Grand Rapids
Marinette
Menekaunee
Oconto
Ft. Howard
Green Bay
De Pere
Appleton
Kaukauna
Menasha
Neenah
Oshkosh
Berlin
Ripon
Fond du Lac
Sheboygan
Manitowoc
Two Rivers
La Crosse
Portage
Baraboo
Beaver Dam
Watertown
Madison
Waukesha
Milwaukee
Bay View
Whitewater
Racine
Kenosha
Janesville
Monroe
Beloit
Prairie du Chien
Dubuque
Galena
Freeport
Rockford
Chicago
Waukegan
Winona
Rock Island
Princeton
Clinton
Dixon
Joliet
Ottawa
Mississippi R.
Wisconsin R.
Rock R.
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L. Monona
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Scale of Miles
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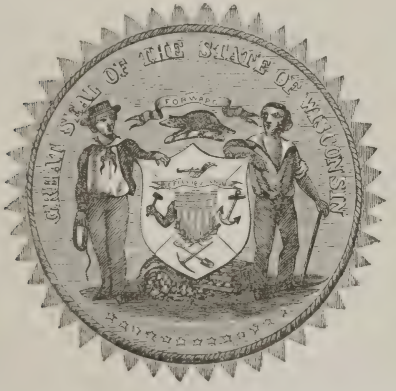
County Towns
Railroads
This type indicates a population of 3,000 or over.
Longitude 90 West from 89 Greenwich

WISCASSET, a port of entry and the shire town of Lincoln co., Maine, on the W. bank of Sheepscot river, 16 m. from its mouth, and on the Knox and Lincoln railroad, 40 m. N. E. of Portland; pop. in 1870, 1,977. It is noted for its fine scenery, and is much frequented as a watering place. It has a good harbor, deep enough for vessels of the largest class, and seldom obstructed by ice. There is a large coasting trade and considerable foreign commerce, the shipments consisting of hay, deals, ice, and box shooks. During the year ending June 30, 1875, the number of entrances in the district in the coasting trade was 32, tonnage 9,921; clearances, 21, tonnage 3,993; vessels engaged in the cod and mackerel fisheries, 113, tonnage 3,860; vessels built, 7, tonnage 1,203; belonging in the district on the above date, 196 vessels, tonnage 9,816. There are manufactories of lumber, bricks, marble, and shoes, a national bank, a savings bank, eight public schools, an academy, a weekly newspaper, a library, and three churches (Congregational, Episcopal, and Methodist).—The town was first settled in 1663, and was known as Pownalborough till 1801, when the name was changed to Wiscasset.



State Seal of Wisconsin.

WISCONSIN, one of the N. W. states of the American union, the 17th admitted under the federal constitution, between lat. 42° 30′ and 46° 58′ N., and lon. 87° 8′ and 92° 54′ W., exclusive of the Apostle islands in Lake Superior, and the islands near the N. E. coast in Green bay and Lake Michigan. It is bounded N. by Lake Superior, N. E. by Michigan, E. by Lake Michigan, S. by Illinois, and W. by Iowa and Minnesota. The Montreal and Menomonee rivers form parts of the boundary line between this state and Michigan, and the Mississippi and St. Croix rivers most of the W. boundary line. Its greatest length N. and S. is about 300 m.; greatest breadth E. and W. about 260 m.; area, according to the federal census, 53,924 sq. m. It is divided into 60 counties, which, with their population according to the state census of 1875, are as follows:

COUNTIES.	Population.	COUNTIES.	Population.
Adams	6,502	Lincoln	895
Ashland	730	Manitowoc	88,456
Barron	8,737	Marathon	10,111
Bayfield	1,032	Marquette	8,597
Brown	85,378	Milwaukee	122,927
Buffalo	14,219	Monroe	21,026
Burnett	1,456	Oconto	13,812
Calumet	15,065	Outagamie	25,558
Chippewa	13,995	Ozaukee	16,545
Clark	7,282	Pepin	5,816
Columbia	28,803	Pierce	15,101
Crawford	15,035	Polk	6,736
Dane	52,798	Portage	14,856
Dodge	48,394	Racine	28,702
Door	8,020	Richland	17,353
Douglas	741	Rock	39,039
Dunn	13,427	St. Croix	14,956
Eau Claire	15,991	Sauk	26,932
Fond du Lac	50,241	Shawano	6,635
Grant	39,086	Sheboygan	34,021
Green	22,027	Taylor	849
Green Lake	15,274	Trempealeau	14,992
Iowa	24,133	Vernon	21,524
Jackson	11,339	Walworth	26,259
Jefferson	34,908	Washington	23,862
Juneau	15,300	Waukesha	29,425
Kenosha	13,907	Waupaca	19,646
Kewaunee	14,405	Waushara	11,523
La Crosse	23,945	Winnebago	45,033
Lafayette	22,169	Wood	6,048

The capital is Madison, and the largest city Milwaukee; in 1875 the former had 10,093 inhabitants, and the latter 100,775. The other principal cities were Appleton, 6,730; Beaver Dam, 3,455; Beloit, 4,605; Berlin, 3,341; Chippewa Falls, 5,050; Eau Claire, 8,440; Fond du Lac, 15,308; Fort Howard, 3,610; Green Bay, 8,037; Janesville, 10,115; Kenosha, 4,959; La Crosse, 11,012; Manitowoc, 5,724; Menasha, 3,170; Mineral Point, 3,054; Neenah, 4,023; Oconto, 4,457; Oshkosh, 17,015; Portage, 4,337; Prairie du Chien, 2,948; Racine, 13,274; Ripon, 3,501; Sheboygan, 6,828; Stevens Point, 3,363; Watertown, 9,424; and Wausau, 2,820. The population of Wisconsin and its rank in the Union, according to the federal census, have been as follows:

YEARS.	White.	Colored.	Total.	Rank.
1840	30,749	196	30,945	29
1850	304,756	635	305,391	24
1860	773,693	1,171	775,881	15
1870	1,051,351	2,113	1,054,670	15

Included in the total for 1870 were 1,206 Indians, and in that for 1860, 1,017. The population in 1875, as returned by the state census, was 1,236,729. Of the total population in 1870, 544,886 were males and 509,784 females; 690,171 were of native and 364,499 of foreign birth. Of the natives, 450,272 were born in the state, 5,714 in Connecticut, 12,234 in Illinois, 6,415 in Indiana, 8,931 in Maine, 10,403 in Massachusetts, 5,302 in Michigan, 105,697 in New York, 23,164 in Ohio, 21,358 in Pennsylvania, and 16,421 in Vermont. Of the foreigners, 25,666 were born in British America, 28,192 in England, 48,479 in Ireland, 6,590 in Scotland, 6,550 in Wales, 5,212 in Denmark, 40,046 in Norway, 2,799 in Sweden, 5,990 in Holland, 162,314 in Germany, and

6,069 in Switzerland. The density of population was 19·56 persons to a square mile. There were 200,155 families, with an average of 5·27 persons to each, and 197,098 dwellings, with an average of 5·35 to each. The increase of population from 1860 to 1870 was 35·93 per cent. In 1870 there were 178,669 males and 175,347 females from 5 to 18 years of age, 192,331 males from 18 to 45, and 203,077 male citizens 21 years old and upward. There were 35,031 persons 10 years of age and over unable to read, and 55,441 who could not write, of whom 41,328 were foreign born; 17,822 males and 22,785 females 21 years old and upward were illiterate. The number of paupers supported during the year ending June 1, 1870, was 1,553, at a cost of $151,181. Of the whole number (1,126) receiving support at that date, 736 were foreigners. The number of persons convicted of crime during the year was 837; of those (418) in prison June 1, 1870, 203 were foreigners. Of the total population 10 years old and over (751,704), there were engaged in all occupations 292,808; in agriculture, 159,687, of whom 50,753 were laborers and 108,240 farmers and planters; in professional and personal services, 58,070, including 1,189 clergymen, 19,141 domestic servants, 24,670 laborers not specified, 785 lawyers, 915 physicians and surgeons, and 4,164 teachers not specified; in trade and transportation, 21,534; and in manufactures and mechanical and mining industries, 53,517. The total number of deaths during the year was 9,960, being 0·94 per cent. of the population. There were 1,318 deaths from consumption, there being 7·6 deaths from all causes to one from that disease; 487 from pneumonia, or 20·5 deaths from all causes to one from that disease; 368 from cholera infantum, 211 from whooping cough, 152 from measles, 186 from diphtheria, 1,016 from scarlet fever, 464 from enteric fever, 296 from diarrhœa, 265 from dysentery, and 280 from enteritis. In 1875 there were 8,162 tribal Indians in Wisconsin, including 1,522 Menomonees, 1,332 Oneidas, and 118 Stockbridges at the Green Bay agency; 4,534 Chippewas at the La Pointe agency; and 656 Winnebagoes not under an agent.—The whole surface of Wisconsin may, with slight exceptions, be considered one vast plain, varied only by the cliffs bordering the rivers and lakes, and the moderate undulations called "rolling." This plain is from 600 to 1,500 ft. above the ocean; the dividing grounds between the valleys usually attain but a slight elevation above the surrounding country, the waters of a lake or marsh being often drained in opposite directions to reach the ocean at widely different points. The highest lands are those along the sources of the tributaries of Lake Superior, which, near the Montreal river, are 1,700 to 1,800 ft. above the sea, gradually diminishing westward to about 1,100 ft. at the W. line of the state. From this great watershed the land slopes rapidly toward the lake, and more gradually toward the south to the lower Wisconsin river, whence there is another slope toward the south drained mostly by the waters of Rock river and its tributaries. At Portage City the Fox and Wisconsin rivers approach so nearly that their waters are often commingled; they are connected by a canal, from which there is a descent of 195 ft. to Green bay and 171 ft. to the Mississippi near Prairie du Chien. There are several elevations called mounds in the S. W. portion of the state; the principal are the Blue, 1,729 ft. above the sea; the Platte, 1,281 ft.; and the Sinsinawa, 1,169 ft. The cliffs along the E. shores of Green bay and Lake Winnebago extend as far as Iron Ridge in Dodge co., and form a bold escarpment not unlike the "mountain ridge" of western New York in general character and geological age. From this ridge the country slopes gradually E. to Lake Michigan. On this slope there is a remarkable series of drift hills and circular depressions called "potash kettles," extending S. S. W. from the peninsula E. of Green bay into the state of Illinois; one of the highest peaks in Washington co. is 1,402 ft. above the sea. Lake Michigan, according to J. T. Gardner's calculations (United States survey reports, 1873), is 589 ft. above the sea. The Mississippi river at the S. W. corner of the state is 576 ft.; at the mouth of the Platte, 8 m. above Dubuque, 591 ft.; at Prairie du Chien, 602; at La Crosse, 632; and at the mouth of the St. Croix river (Prescott), 677; and it therefore has a descent in this part of its course of 5 in. per mile. The descent of Fox river from Lake Winnebago to Green bay is 162 ft., forming one of the most valuable series of water powers in the west.—The Mississippi forms the western boundary of the state for about 250 m., and in that distance receives the waters of the St. Croix, Chippewa, Black, and Wisconsin rivers. The other principal rivers are the Rock, another tributary of the Mississippi; the St. Louis, Bois Brulé, Bad, and Montreal, flowing into Lake Superior; the Menomonee, Peshtigo, Oconto, Pensaukee, and Fox, with its tributary the Wolf, flowing into Green bay; and the Manitowoc, Sheboygan, and Milwaukee, tributaries of Lake Michigan. Innumerable smaller streams water almost the whole surface; their waters are usually clear, originating in springs and small lakes. Many of those at the north have beautiful cascades or rapids; and at the south they often run through narrow rocky gorges, called "dells." The Mississippi is navigable for steamboats throughout its course on the border of the state; the Wolf and Fox rivers are navigable for small steamboats, the latter having been artificially improved; and many of the streams afford ample water power. Besides the two great lakes, Superior and Michigan, there are numerous others, especially in the central and northern portions of the state; they are from 1 to 20 or 30 m. in extent, usually with high, picturesque banks, and deep water, abounding in fish. The greatest numbers are found near the sources of the Chippewa and St. Croix rivers, the whole surface being studded with them, so that in some districts it would be difficult to travel 5 m. without finding a lake. A kind of wild rice (*zizania aquatica*) grows in the shallow waters, affording sustenance to innumerable water birds. The principal lakes are Winnebago, the largest, St. Croix, Pepin, Poygan, Pewaukee, Geneva, Green, Koshkonong, and the Four Lakes.—The geology of the state is simple, the series of rocks extending from the Laurentian to the Devonian. In the north central portion of the state there is a large area of archæan (azoic) rocks, having an extreme length E. and W. of nearly 240 m., and a breadth N. and S. of 160 m. These rocks are metamorphic in origin, and consist chiefly of granite, gneiss, syenite, diorite, and other hornblendic and allied rocks, quartzite, porphyrite, and a variety of schists and slates. The falls and rapids of the St. Croix, Chippewa, Black, Wisconsin, Wolf, Peshtigo, Menomonee, Montreal, and other rivers are due to the unequal hardness of these rocks. Besides the main area, there are in the south central part of the state outcrops of limited extent entirely surrounded by later formations, through which they project. The greater part of the archæan rocks of the state are regarded as belonging to the Laurentian period, though the Huronian are well developed. The unconformability of the two has been demonstrated, but their boundaries have not yet been satisfactorily traced at all points. To the latter period belongs the Penokee Iron range, which abounds in magnetic iron not yet worked. Similar iron deposits also occur on the Menomonee river and at Black River Falls. The copper-bearing series is found in Ashland, Bayfield, Douglas, Burnett, and Polk cos., and contains copper, but to what extent is not yet fully ascertained. Resting unconformably upon the archæan rocks is the Potsdam sandstone, forming a belt on almost every side from 10 to 60 m. in breadth. The general form of the sandstone district is that of a crescent, its horns on the Menomonee and St. Croix rivers, and its greatest breadth in the region of the Wisconsin river, near the middle of the state. The sand is generally pure, frequently suitable for the manufacture of glass. It often contains calcareous beds with fossil remains of a very ancient fauna; the decay of these beds mingling with the sand renders the soil fertile. This rock often forms bold cliffs and prominent peaks. The strata present ripple marks, cross laminations, and other evidences of deposition in shallow water. Next above the Potsdam sandstone is a heavy deposit of limestone, locally known as the lower magnesian limestone; it contains copper ores in a few places, and also lead. This is succeeded by the upper sandstone, having many of the characteristics of the Potsdam, upon which are the blue and Galena limestones (or dolomites) of the Trenton period, chiefly in the latter of which are found, in the S. W. part of the state and adjoining portions of Iowa and Illinois, the fissures containing deposits of lead, zinc, and copper ores. In this district, though yielding large quantities of lead, the soil is rich and productive. These mines were first discovered by Le Sueur in 1700, but attracted little attention till 1826, from which time the quantity of lead produced increased rapidly till about 1845, since which it has declined. Upon the Galena limestone rest the blue and green shales and limestones of the Cincinnati group, and upon these at Iron Ridge, Hartford, and other points in eastern Wisconsin, rest the Clinton iron ore beds, which attain at the first named place the unusual thickness of 25 ft., consisting of regular horizontal beds, which are extensively mined with the very greatest facility. Above this, and forming the surface rock over a large area in the E. part of the state, is the Niagara limestone, which is highly magnesian, and contains some of the purest stratified dolomites known. It affords excellent building material and quicklime of the first quality. Near Milwaukee, covering a limited space, occurs a rock now known as the Milwaukee cement stone, from the hydraulic properties which it has recently been shown to possess in a high degree. It belongs to the Hamilton period of the Devonian age. The limestone district of Wisconsin includes nearly all those portions lying S. and E. of the Fox and lower Wisconsin rivers, with considerable tracts along the Mississippi and W. of Green bay. All these rocks are older than those of the coal formation; hence no coal is found in this state. With the exception of the lead region, and the counties along the Mississippi river, the state is covered with a heavy deposit of clay, sand, gravel, and bowlders or "drift;" and it is generally this deposit rather than the underlying rocks that gives character to the soil. Among the pebbles masses of native copper are often found, associated with silver, clearly showing that this drift had its origin at the north. The drift, in a modified form, furnishes the clay from which cream-colored bricks are made, of great beauty and durability. A geological survey of the state is in progress; a full report is now (1876) in preparation.—Lead ore is the most important mineral product of the state, found chiefly in the counties of Grant, Lafayette, and Iowa; it is mostly the sulphuret (galena), though the carbonate (called white mineral) often occurs. Iron ores are found in great quantities and of easy access at Iron Ridge in Dodge co., at Ironton in Sauk co., at the Black river falls in Jackson co., and in the Penokee Iron range, in Ashland co., near Lake Superior. Magnetic ores also occur in the archæan region in the vicinity of the Menomonee river, in the N. E. part of the state. The ore has been smelted only at Iron Ridge, Ironton, and Black River Falls. Native copper is found in limited quantities in the N.

part of the state; and copper ores have been discovered in fissures in Iowa and Crawford counties. Two ores of zinc, associated with the lead, have been smelted at Mineral Point. Limestone suitable for polishing (or marble) has been found; the drift affords clay suitable for the coarser wares and for brick; beds of peat and of shell marl occur in the marshes and beds of ancient lakes. Carnelians and agates are picked up among the pebbles of the lake shores, and are found associated with the trap rocks.—The mean annual temperature of the southern and more settled portion of the state is 46° F.; mean temperature of winter, 20°; of spring and autumn, 47°; and of summer, 72°. The waters of Lake Michigan materially affect the temperature of the counties along its shores, moderating both the excessive heat of summer and the cold of winter; and hence the temperature of January at Milwaukee is found on the Mississippi river half a degree of latitude further S., and that of July at St. Paul, 2° further N. The N. part of this lake only is covered with ice in winter, which never reaches as far S. as Milwaukee. The Milwaukee river remains closed on an average about 100 days, from the end of November to the middle of March. Snow always falls in the north before the occurrence of heavy frosts, protecting the ground and the roots of plants from freezing, and accelerating the growth of vegetation in the spring. In the south snow often lies to the depth of 12 to 18 in., but some winters pass almost without snow. The prevailing winds of spring are from N. E.; of summer, S. W.; of autumn and winter, W. The winters are cold, mostly uniform, with many clear dry days; the springs are backward, the summers short and hot, the autumns mild and almost always pleasant. The annual quantity of rain and melted snow is about 32 in. The barometer varies in its extremes from 28 to a little above 30 in., the mean being about 29·5 in.—The fauna of Wisconsin embraces the elk, deer, bear, beaver, fisher, wolf, otter, wild cat, porcupine, striped gopher, bat, mole, squirrel, pouched rat, &c. The buffalo, wild turkey, and some other species are extinct. The larger birds are the golden and bald eagles, great white owl, quail, partridge; the spruce, willow, prairie, and sharp-tailed grouse; woodcock, wild goose, ducks in great numbers and varieties, pelican, loon, &c. Pigeons are abundant. Great quantities of fish are annually caught in Lakes Superior and Michigan, as well as in the smaller lakes and rivers; among these the most important are the white fish, trout, siskiwit, muskallonge, pickerel, and perch; the most curious are the billfish and the spoonbill sturgeon. The flora of Wisconsin embraces about 150 species of compound flowering plants (sunflowers, &c.), which formerly occurred so abundantly in the prairies and open districts as often to give a yellow hue to the landscape in the latter part of the flowering season. Nearly all the N. half of the state abounds in pine, balsam, hemlock, and other cone-bearing evergreen trees, of which the lofty white pine is the most common. The great prairies of Illinois extend into several of the southern counties of Wisconsin, between which and the heavily timbered districts is a region of openings, in which the bur oak (*quercus macrocarpa*) chiefly abounds. A line drawn from Racine on the W. shore of Lake Michigan in a N. W. direction will mark the boundaries between the openings and the heavily timbered lands. The red oak (*Q. rubra*) is the only species of oak that extends as far N. as the shores of Lake Superior.—The ancient earthworks, so abundant in the western states, assume in Wisconsin imitative forms, being intended to represent the human figure, or that of some of the more familiar animals. These are usually combined and associated with circular mounds and ridges running in straight or curved lines. The most important and best known are those at Aztalan in Jefferson co., where a space of 17⅔ acres is enclosed by a wall of earth and burnt clay (not proper brick), supported at regular intervals by mounds or buttresses. Fragments of rude pottery are often found, with arrow heads of flint, and stone axes, pipes, &c.—Wisconsin is in the front rank of agricultural states. Agriculture is encouraged by annual legislative appropriations to the state agricultural society, and to each of the county societies. According to the federal census of 1870, the state contained 11,715,321 acres of land in farms, of which 5,899,343 were improved, 3,437,442 woodland, and 2,378,536 other unimproved land. The total number of farms was 102,904, and the average size 114 acres. There were 10,955 containing between 10 and 20 acres, 40,064 between 20 and 60, 30,060 between 50 and 100, 15,776 between 100 and 500, 112 between 500 and 1,000, and 32 over 1,000. The cash value of farms was $300,414,064, and of farming implements and machinery $14,239,364. The total estimated value of farm productions, including betterments and additions to stock, was $78,027,032; value of orchard products, $819,268; of produce of market gardens, $226,665; of forest products, $1,327,618; of animals slaughtered or sold for slaughter, $11,914,643; of all live stock, $45,310,882. According to the United States department of agriculture, the principal crops in 1873 were:

CROPS.	Quantity produced.	Average yield per acre.	No. of acres in each crop.	Total value.
Indian corn, bush.	16,308,000	30	543,600	$7,175,520
Wheat...........	26,322,000	16·5	1,595,273	25,532,340
Rye..............	1,240,000	15·7	78.981	768,800
Oats..............	18,862,000	35	538,914	6,224,460
Barley...........	1,515,000	26·6	56,955	1,636,200
Buckwheat	289,000	11	26,273	265,880
Potatoes.........	4.964,000	71	69,915	3,971,200
Tobacco, lbs......	3,750,000	1·05	3,571	225,000
Hay, tons........	1,370,000	1·3	1,053,846	13,015,000
Total........	....	......	3,967,328	$58,814,400

The number of acres planted with the leading crops in 1875, as returned by the state assessors (five counties not reported), was: wheat, 1,539,008; oats, 766,343; Indian corn, 866,081; barley, 117,020; rye, 97,286; hops, 9,720; tobacco, 4,399; flax, 6,224. There were 291,815 horses, valued at $12,374,928; 6,592 mules and asses, $304,839; 805,881 neat cattle, $8,979,158; 1,025,990 sheep and lambs, $1,640,967; and 462,300 swine, $1,188,564. The production of wool in 1870 was 4,090,670 lbs., from 1,069,282 sheep; butter, 22,473,036 lbs., from 308,377 cows; cheese (on farms), 1,591,798 lbs.; flax, 497,398 lbs.; maple sugar, 507,192 lbs.; honey, 299,341 lbs.; sorghum molasses, 74,478 gallons. Commissioners have been appointed to stock the waters of the state with fish, and a hatching house has been erected.—In 1870 there were 7,013 manufacturing establishments, having 926 steam engines of 30,509 horse power, and 1,288 water wheels of 33,714 horse power, and employing 43,910 hands, of whom 40,296 were males above 16, 2,114 females above 15, and 1,500 youth. The capital invested amounted to $41,981,872; wages paid during the year, $13,575,642; value of materials used, $45,851,266; of products, $77,214,326. The leading industries were:

INDUSTRIES.	No. of establishments.	Hands employed.	Capital.	Value of products.
Agricultural implements..	82	1,387	$1,494,700	$2,393,428
Boots and shoes..........	753	2,352	1,082,268	2,271,425
Bread, crackers, and other bakery products........	59	191	127,250	410,227
Brick..................	79	1,133	456,050	509,626
Carriages and wagons....	485	2,184	1,252,476	2,596,534
Cheese	54	177	126,740	249,056
Clothing, men's..........	232	1,785	1,075,185	2,260,004
Cooperage...............	250	717	207,040	627,190
Flouring and grist-mill products................	581	2,031	6,574,650	20,419,877
Furniture................	188	1,844	1,793,505	1,542,356
Iron, forged and rolled....	1	642	100,000	1,129,562
" pigs................	6	592	865,000	737,268
" castings............	74	719	760,500	1,423,193
Lead, pig................	13	91	91,000	514,402
Leather, tanned..........	85	577	906,184	2,013,093
" curried..........	70	322	407,206	2,360,347
" dressed skins....	19	85	56,350	129,641
Lime....................	53	312	228,180	307,729
Liquors, distilled.........	8	104	171,000	425,340
" malt............	176	835	2,108,150	1,790,273
Lumber, planed..........	33	263	$254,800	$614,270
" sawed..........	719	12,458	11,448,345	15,129,869
Machinery, not specified..	44	811	812,024	555,606
" cotton and woollen................	2	34	35,000	24,300
Machinery, railroad and repairing............ ..	3	25	23,000	63,100
Machinery, steam engines and boilers.............	17	448	521,000	738,410
Malt.....................	3	33	178,000	213,000
Paper	6	207	445,000	873,200
Saddlery and harness.....	269	672	342,211	711,695
Sash, doors, and blinds....	81	1,381	1,413,793	1,852,379
Soap and candles.........	16	69	103,430	280,685
Tin, copper, and sheet-iron ware	225	605	388,339	769,470
Tobacco and cigars.......	1	34	75,000	122,000
" chewing and smoking..................	4	128	190,000	495,000
Tobacco, cigars	109	597	808,230	605,032
Wooden ware............	6	361	188,700	342,198
Woollen goods...........	48	736	1,211,289	1,115,646

The products of mining were valued at $510,982, including iron worth $22,000, lead $369,067, peat $750, stone $106,925, and zinc $12,240. The total production of lead ore from 1862 to 1873 was 163,422,672 lbs. The amount of zinc ore obtained in the lead region of Wisconsin, Iowa, and Illinois from 1860 to 1873 inclusive was 155,302,150 lbs., most of it being the production of Wisconsin. The yield amounted to 25,921,785 lbs. in 1871, 43,278,358 in 1872, and 33,603,570 in 1873. The manufacture of lumber is an important industry, there being in the state a capacity for producing about 1,500,000,000 ft. annually. Besides an immense quantity of shingles, there were made 983,631,402 ft. of lumber in 1874, and 1,097,443,681 in 1875. There were on hand on Jan. 1, 1876, 268,640,309 ft. of lumber and 279,336,000 ft. of logs.—Wisconsin had 20 m. of railroad in 1850, 187 in 1855, 905 in 1860, 1,010 in 1865, 1,525 in 1870, and 2,565 in 1876. A general supervision over the railroads of the state is exercised by a state commissioner, who receives reports from the companies and makes reports to the legislature. The railroads lying wholly or partly within the state in 1876 were as follows:

NAMES OF CORPORATIONS.	TERMINI.		LENGTH.	
	From	To	In Wisc'nsin.	Total.
Chicago and Northwestern......................	Chicago, Ill.............	Fort Howard...........	171	242
	Fort Howard............	Menomonee............	49	49
	Rockford, Ill............	Kenosha...............	27	72
	Elgin, Ill................	Geneva Lake...........	8	43
	Belvidere, Ill............	Elroy..................	121	141
	Elroy....................	Winona Junction.......	55	55
Chicago and Milwaukee*...........................	Chicago, Ill.............	Milwaukee............	40	85
Northwestern Union*..............................	Milwaukee..............	Fond du Lac...........	63	63
La Crosse, Trempealeau, and Prescott*.............	Winona Junction.........	Winona, Minn	28	29
Chicago, Milwaukee, and St. Paul................	Milwaukee..............	La Crosse.............	196	196
	Milwaukee..............	Prairie du Chien	193	193
	Watertown	Madison..............	87	87
	Milwaukee..............	Portage...............	96	96
	Horicon	Berlin.................	48	43
	Rush Lake..............	Winneconne	14	14
	Milton..................	Monroe...............	42	42

* Operated by the Chicago and Northwestern company.

NAMES OF CORPORATIONS.	TERMINI.		LENGTH.	
	From	To	In Wisconsin.	Total.
Wisconsin Union	Chicago, Ill.	Milwaukee	88	85
Madison and Portage	Madison	Portage	39	89
Oshkosh and Mississippi	Ripon	Oshkosh	20	20
Galena and Southern Wisconsin	Galena, Ill.	Platteville	20	31
Green Bay and Minnesota	Green Bay	Winona	218	218
Milwaukee, Lake Shore, and Western	Milwaukee	Appleton	120	120
Branch	Manitowoc	Two Rivers	6	6
Mineral Point	Mineral Point	Warren, Ill.	31	33
Branch	Calamine	Platteville	18	18
Sheboygan and Fond du Lac	Sheboygan	Princeton	79	79
Superior and St. Croix	Superior City		16	24
Western Union	Rockland, Ill.	Racine	71	197
Branch	Elkhorn	Eagle	16	16
West Wisconsin	St. Croix Lake	Elroy	178	178
Chippewa Falls and Western	Eau Claire	Chippewa Falls	11	11
North Wisconsin	North Wisconsin Junction		40	40
Wisconsin Central	Menasha	Worcester	194	194
	Ashland	Penokee	29	29
Milwaukee and Northern	Milwaukee	Schwartzburg	6	6
	Schwartzburg	Green Bay	107	107
	Hilbert	Menasha	16	16
Branch	Stevens Point		20	20
Wisconsin Valley	Tomah	Wausau	89	89

The Fox and Wisconsin rivers are connected by the Portage canal, which extends through Portage City, about one mile. Important improvements by the national government in these rivers have been in progress for several years, by means of which and the construction of a ship canal it is contemplated to open a channel for large vessels between the Mississippi river and Lake Michigan. The United States customs district of Milwaukee includes all the shores, harbors, and waters of Wisconsin bordering on Lake Michigan. Milwaukee is the port of entry, and De Pere, Green Bay, Kenosha, Racine, and Sheboygan are ports of delivery. La Crosse is a port of delivery in the district of Louisiana. The foreign commerce of Milwaukee is considerable, and the domestic trade is very extensive. (See MILWAUKEE.) During the year ending June 30, 1875, the domestic exports to foreign countries amounted to $1,390,179, including 1,233,483 bushels of wheat, valued at $1,351,884. The imports were valued at $56,646. In the foreign trade 3 vessels of 878 tons entered, and 9 vessels of 2,745 tons cleared. In the coastwise trade 7,230 vessels of 2,812,493 tons entered, and 7,261 of 2,798,208 tons cleared. The number of vessels belonging to the port was 342, of 62,157 tons, of which 276 were sailing vessels and 66 steamers. The number of national banks in operation at the close of 1875 was 42, having a paid-in capital of $3,550,000 and an outstanding circulation of $2,914,329.—The constitution gives the right of suffrage to male citizens and persons who have declared their intention to become citizens, who are 21 years of age and have resided in the state one year. The legislative power is vested in a senate of 33 members chosen for two years, and an assembly of 100 members elected annually. Each member receives $350 a year and 10 cts. a mile for travel to and from the capital. In case of an extra session of the legislature, no additional compensation is allowed. The legislature meets annually on the second Wednesday in January. The chief executive and administrative officers are the governor, annual salary $5,000; lieutenant governor, who acts as president of the senate, $1,000; secretary of state, who is *ex officio* auditor, $5,000; treasurer, $5,000; attorney general, $3,000; and state superintendent of education, $1,200 and certain allowances. The salaries of the secretary of state, treasurer, and attorney general, as given (previously $1,200, $1,400, and $2,000, with fees, respectively), were fixed by act of 1876, to take effect in 1877. All are elected for two years. The state election is held on the Tuesday after the first Monday in November. Other state officers are three commissioners of school and university lands, one of railroads, four of fish and fisheries, three of the state prison, and a state board of charities and reform composed of five members. The judicial power is vested in a supreme court, 13 circuit courts, courts of probate, and justices of the peace. The supreme court consists of a chief and two associate justices. It has in general only appellate jurisdiction. Two terms are held annually at Madison. The circuit courts have general original jurisdiction in civil and criminal matters, and appellate jurisdiction over all inferior courts. Both they and the supreme court issue writs of habeas corpus, mandamus, injunction, quo warranto, and certiorari. Judges of the supreme and circuit courts are elected by the people for six years. By a recent law, not applicable to those then in office, the salaries of the former were increased from $4,000 to $5,000 a year, and of the latter from $2,500 to $3,000. A circuit court must be held at least twice a year in each county. A judge of probate is elected by the people in each county for four years; justices of the peace are elected by the people for two years in the several cities, towns, and villages. United States courts are held at Milwaukee (semi-annually) and Oshkosh (annually) in the eastern district, and at Madison (semi-annually) and La Crosse (annually) in the western district. Wisconsin is represented in congress by two senators and eight representatives, and has therefore ten votes in the electoral college. The constitution requires a state census to be taken every ten years; the latest one was in 1875.—On Sept. 30, 1875, the total state debt amounted to $2,252,057, viz.: bonds outstanding, $14,000; due to the school fund, $1,559,700; university fund, $111,000; agricultural college fund, $51,600; normal school fund, $515,700; currency certificates, $57. The total receipts on account of the general fund during the year were $1,136,483, and the disbursements $1,260,168. The chief sources of revenue were: state tax, $592,070; tax on railroad companies, $436,414; on insurance companies, $67,859. Among the items of expenditure were: interest on state debt, $157,820; legislature, $86,645; and state institutions, $565,030. The total valuation of property, as determined by the state board of assessments, with the amount and rate of state taxes, has been as follows:

YEAR.	Valuation.	State tax.	Rate per cent.
1871	$455,900,800	$629,143 10	$1\frac{38}{100}$ mill.
1872	390,454,875	765,291 55	$1\frac{96}{100}$ "
1873	390,454,875	671,582 38	$1\frac{72}{100}$ "
1874	421,285,359	526,606 35	$1\frac{1}{4}$ "
1875	421,285,359	589,799 83	$1\frac{4}{10}$ "

The total amount of property exempt from taxation was $14,174,721, including $1,655,349 common school, $3,951,783 church, and $4,301,753 railroad property.—The general supervision of the charitable and correctional institutions is vested in a state board of charities and reform, consisting of five members appointed for five years by the governor. The institute for the blind, at Janesville, was opened in 1850, and in 1875 had a total of 82 and an average of 59 students. The current expenses amounted to about $18,000. The institute for the deaf and dumb, at Delavan, opened in 1852, had in 1875 a total of 180 and an average of 132 pupils; the ordinary expenses of the institution were about $34,000. The state hospital for the insane, opened in 1860, is at Madison, and the northern hospital for the insane, opened in 1873, at Oshkosh. In 1875 there were in the former a total of 507 and an average of 364 inmates, and in the latter a total of 351 and an average of 257. The current expenses of the former were $63,500, and of the latter nearly $55,000. According to the federal census of 1870, there were in the state 409 blind, 459 deaf and dumb, 846 insane, and 560 idiotic. According to the returns of the state census of 1875, the numbers of these classes were: blind, 503; deaf and dumb, 720; insane, 1,422. The state prison is at Waupun. The total number of convicts in 1875 was 357; average number, 240. Labor is performed in the prison on account of the state, the chief industries being the manufacture of chairs, wagons, boots and shoes, clothing, and stone work. The institution is not self-sustaining. The receipts from labor, &c., in 1875 amounted to about $53,000; the total disbursements were about $100,000; the state appropriation was $46,341. A school is maintained in the prison, which also has a library. The present site of the prison is too distant from sources of supply and from a market for the articles manufactured. In 1875 a resolution was passed by the legislature providing for the appointment of a commission to consider the expediency of a change, to recommend a more suitable site, and to report to the next legislature. It is recommended that the present prison be transformed into an institution for the incurable insane, of whom about 500 are confined in the poorhouses and jails. The industrial school for boys was opened at Waukesha in 1860, where it has a farm of 233 acres, mostly cultivated. In 1875 there was a total of 412 and an average of 301 inmates. The ordinary expenses of the institution were about $45,000. Boys between the ages of 10 and 16 years are committed to this institution by the courts and magistrates, for vagrancy and other minor offences. The soldiers' orphan home was organized as a state institution and opened in Madison in 1866. It continued in successful operation, with an average annual attendance of about 200, till 1874, when the legislature authorized the trustees to prepare for closing it. The total number of orphans who have received its benefits exceeds 600; the total cost to the state for the purchase of buildings and maintenance has been about $342,000. In 1875 the legislature authorized the transfer of the buildings and grounds to the regents of the state university for a medical college. In 1875 the legislature appropriated $5,000, to be distributed among the following private charitable institutions, which are thereby brought under the supervision of the state board of charities and reform: Cadle home, in Green Bay; St. Luke's hospital, in Racine; and St. Rose orphan asylum, St. Joseph orphan asylum, Milwaukee orphan association, St. Æmilian asylum, and home for the friendless, in Milwaukee. The northwestern branch of the national asylum for disabled soldiers is about 3 m. from Milwaukee, where it has a farm of 425 acres and a brick building with accommodations for 700 or 800 inmates. The average number of inmates in 1875 was 642.—The general management of the public schools is vested in a state superintendent, 64 county superintendents, 27 city superintendents, and a school board in each district. The state and county superintendents hold office for two years, and the district officers for three years. In each independent city there is a board of education, and the larger cities have each a superintendent, who in some cases is also principal of the high school. By law of 1869 towns are authorized to adopt the township system of school government, under which each town becomes a school district. This system has been adopted by only a few towns. The school fund created by the constitution of 1848 comprises: 1, the income from the proceeds of lands granted by the United States to the state for educational purposes; 2, all moneys accruing from forfeiture or escheat; 3, all fines collected in the several counties for breach of the penal laws; 4, all moneys paid for exemption from military duty; 5, five per cent. on the sale of government lands. The first is the principal source. The whole amount of school and university lands held by the state on Sept. 30, 1875, was 1,622,642 acres, classified as follows: school, 221,438; university, 4,407; normal school, 612,774; drainage (held in trust for counties), 722,229; agricultural college, 52,404; Marathon county, 9,390. The amounts of the various funds for educational purposes at that date were as follows:

FUNDS.	Productive.	Unproductive.
School	$2,624,239	$260,000
University	222,256	9,000
Normal school	976,364	735,000
Agricultural college	236,134	65,000
Drainage	12,643	866,000
Total	$4,071,636	$1,935,000

The unproductive funds consist of unsold lands held in trust by the state; the amounts above given are estimated. The income of the school fund during the year ending Sept. 30, 1875, amounted to $186,409, and the disbursements to $185,961. In 1874–'5 the total number of children in the state over 4 and under 20 years of age was 461,829; the total number of persons receiving instruction was 293,888, viz.: in the public schools, 279,854; private schools, 10,733; colleges and academies, 2,150; benevolent institutions, 1,150. There were 5,489 school districts and 5,197 school houses, valued with sites and apparatus at $4,979,169, and having accommodations for 330,189 pupils. The total number of graded schools in the state was about 400. During the year there were 816,097 school days in the public schools; the number of teachers required was 6,224; 9,455 different teachers were employed. The total amount expended for schools was $2,065,370, including $1,350,784 for teachers' wages. In 1865 the legislature set apart certain lands for the creation of a fund for the establishment and maintenance of normal schools. This fund amounted on Sept. 30, 1875, to $976,364, and the total income, including tuition fees of three schools, to $75,994. A board of regents of the normal schools was incorporated by the legislature in 1866, and since that date four state normal schools have been opened. Their condition in 1875–'6 was as follows:

WHERE SITUATED.	When opened.	Total number of instructors.	PUPILS.	
			Total.	In normal department.
Platteville	1866	10	455	200
Whitewater	1868	12	400	266
Oshkosh	1871	16	521	321
River Falls	1875	10	430	120

The law providing for the establishment of these schools declares that their purpose shall be, besides training teachers, "to give instruction in agriculture, chemistry, the arts of husbandry, the mechanic arts, the fundamental laws of the United States and this state, and in what regards the rights and duties of citizens." An elementary course of two years and an advanced course of four years (including the two years' course) have been prescribed for each of the state normal schools. On the completion of the four years' course a diploma is awarded by the board of regents, which exempts the holder from examination as a teacher in the common schools of the state. Each assembly district in the state is entitled to send to any one of the normal schools six students, to whom no charge will be made for tuition. The appointments are made by the county and city superintendents. The board of regents are authorized to expend $5,000 annually for the support of teachers' institutes. In 1874–'5, 57 institutes were held in 44 counties, and were attended by 3,760 teachers and persons desiring to teach. The colleges and universities of the state in 1875–'6 were:

NAME OF INSTITUTION.	When opened.	Where situated.	Denomination.	Departments or courses.	Number of instructors.	Pupils in collegiate department.	Pupils in all departmen's.
Beloit college	1847	Beloit	Congregational and Presbyterian	Preparatory and collegiate	10	84	194
Galesville university	1860	Galesville	Methodist Episcopal.	Preparatory and collegiate	5	29	135†
Lawrence university	1849	Appleton	" "	Preparatory, academic, and collegiate	13	102	333
Milton college	1867*	Milton	Seventh-day Baptist.	Preparatory and collegiate	9	82	270
Northwestern university.	1864	Watertown	Lutheran	Academic and collegiate	8	..	210
Pio Nono college and normal school	1871	St. Francis Station.	Roman Catholic	Collegiate and normal	8	44	105
Racine college	1852	Racine	Episcopal	Letters, science, and grammar school	20	..	157
Ripon college	1863	Ripon	Congregational	Collegiate and preparatory	13	69	358
St. John's college	1865	Prairie du Chien	Roman Catholic	Collegiate and preparatory	14	80	150
University of Wisconsin.	1850	Madison	Not denominational.	Collegiate and others	27	..	345

* Opened as an academy, 1844. † 1874–'5.

Instruction in science and law is afforded by the state university. (See WISCONSIN, UNIVERSITY OF.) Nashotah house, at Nashotah mission, is a Protestant Episcopal school of theology, and the seminary of St. Francis of Sales, at St. Francis, is a Roman Catholic school of theology. The chief academies and seminaries are Carroll college at Waukesha, Elroy seminary at Elroy, Rochester seminary at Rochester, which are open to both sexes, and Kemper hall at Kenosha and St. Clara academy at Sinsinawa Mound, which are exclusively for females. Women are also admitted to the university of Wisconsin, Lawrence university, and Milton and Ripon colleges.—According to the federal census of 1870, the total number of libraries was 2,883, having 905,811 volumes. Of these, 1,551 with 527,131 volumes were private, and 1,332 with 378,680 volumes were other than private. There were 4 state libraries with 61,400 volumes; 9 town, city, &c., 4,838; 8 court and law, 1,010; 194 school, college, &c., 50,492; 1,008 sabbath school, 209,503; 70 church, 12,550; and 39 circulating, 38,867. The library of the state historical society in Madison has 67,000 books, pamphlets, &c., and the state law library in Madison 12,000 volumes. The total number of newspapers and periodicals reported by the federal census of 1870 was 190, having a circulation of 343,385 and issuing annually 28,762,920 copies. There were 14 daily, with a circulation of 43,250; 2 tri-weekly, 3,200; 3 semi-weekly, 6,850; 160 weekly, 266,000; 2 semi-monthly, 1,900; and 9 monthly, 22,185. In 1875 the total number was 253, viz.: 19 daily, 2 weekly, 2 semi-weekly, 207 weekly, 1 bi-weekly, 1 semi-monthly, and 21 monthly. In 1870 there were 1,864 religious organizations, having 1,466 edifices with 423,015 sittings and property valued at $4,890,781, as follows:

DENOMINATIONS.	Organizations.	Edifices.	Sittings.	Property.
Baptist, regular	145	109	32,480	$414,223
" other	67	33	10,500	91,400
Christian	13	5	1,450	9,000
Congregational	157	140	44,960	619,550
Episcopal, Protestant	82	70	21,200	389,585
Evangelical Association	179	88	24,175	237,450
Friends	2	2	375	1,100
Jewish	4	3	750	8,500
Lutheran	171	156	36,780	302,860
Methodist	508	396	103,240	973,018
Moravian (Unitas Fratrum)	13	10	2,500	21,700
Mormon	1	...	......	....
New Jerusalem (Swedenborgian)	5	4	800	14,000
Presbyterian, regular	96	84	23,480	300,070
" other	2	2	450	8,000
Reformed church in America (late Dutch Reformed)	5	5	1,015	7,780
Reformed church in the United States (late German Reformed)	18	14	3,260	24,595
Roman Catholic	329	304	104,000	1,334,450
Second Advent	10	3	650	9,000
Spiritualist	2	...	......	....
Unitarian	7	5	1,900	41,000
United Brethren in Christ	34	21	5,650	37,900
Universalist	12	10	3,150	43,300
Unknown (local mission)	1	1	100	1,800
Unknown (union)	1	1	150	500

—The name of the state, taken from the river Wisconsin (originally used with the French orthography *Ouisconsin*), is said to mean as an Indian word "wild rushing river." The territory of Wisconsin was formed in 1836 out of lands then comprised within the territory of Michigan. It embraced all the land now within the states of Wisconsin, Iowa, and Minnesota, and that part of the present territory of Dakota which lies E. of the Missouri and White Earth rivers. In 1838 all of the territory W. of the Mississippi river and of a line due N. from the sources of that river to the international boundary line was taken to form the territory of Iowa. As thus bounded, Wisconsin became a state in 1848. In 1849 a part of the state was taken to form part of the territory of Minnesota, since which time the area of Wisconsin has remained unchanged. The first territorial government was formed at Mineral Point in July, 1836, and in October of the same year the first territorial legislature assembled at Belmont in Iowa co. Madison was chosen as the permanent seat of government, and the legislature first assembled there in November, 1838. In 1836 the population was reported at 11,683. An enabling act for the admission of the state into the Union was passed by congress in 1846. A constitution was framed by a convention sitting at Madison from Oct. 5 to Dec. 6; it was approved by congress in 1847, but was rejected by the people on account of certain provisions relating to banks. A second convention was held at Madison from Dec. 15, 1847, to Feb. 1, 1848, and prepared a constitution which was ratified by the people on March 2 by a vote of 16,442 to 6,149. The state was admitted into the Union under an act of congress of May 29, 1848, and the legislature assembled at Madison in June. The original constitution, as amended several times, is still in force. The number of troops furnished by Wisconsin to the federal army during the civil war was 96,118, equivalent to 78,985 for 3 years. (See supplement.)

WISCONSIN, University of, an institution of learning at Madison, Wisconsin. In 1838 congress granted to the territory of Wisconsin 46,080 acres of land for the support of a university. In that year the university was incorporated by the territorial legislature, and Madison selected as its site; but it was not organized until after Wisconsin became a state. The state constitution adopted in 1848 provided for the establishment of a state university at or near the seat of government, and set apart as a perpetual fund the proceeds of all lands granted or to be granted by the United States to the state for the support of a university. In the same year the university was incorporated and a board of regents appointed. A preparatory department was opened in 1849, the university was formally opened in January, 1850, and the first college classes were formed in 1851. In 1854 another national grant of 46,080 acres of land was made to the university, which also received in 1866 the 240,000 acres of land granted to the state by congress in 1862 for the establishment of an agricultural college. Pursuant to the conditions of the latter grant, the university was reorganized in 1867. Prior to 1866 the institution had received nothing from the state; but appropriations have since been made to the amount of $170,000, including $50,000 in 1870 for the erection of "ladies' hall," and $80,000 in 1875 for the construction of "science hall." By the law of 1876 a tax of one tenth of a mill on the total valuation of the state is to be levied annually for the university, increasing its revenue by about $40,000. In 1875 the university fund amounted to $231,256, of which $222,256 was productive; the income from all sources was $42,671. The productive agricultural fund was $236,134, yielding an annual income of $16,207; unproductive, $65,000. The general management of the university is vested in a board of 11 regents, comprising, besides the state superintendent of public instruction, 10 members appointed for three years by the governor, being one from each congressional district and two for the state at large. The president of the university is chosen by the regents. The system of instruction embraces a college of letters, a college of arts, and a school of law. The college of letters comprises a department of ancient classics with the usual collegiate course of studies, and a department of modern classics, which differs from the preceding chiefly by the substitution of French and German for Greek. The college of arts embraces the department of general science, with a four years' course; agriculture, four; civil engineering, four; mining and metallurgy, four; mechanical engineering, four; and military science. There are also a sub-freshman course of one year, and a post-graduate course of two years. The studies of the latter are elective. The law school, organized in 1868, affords a course of one year. Judges of the supreme court are members of the faculty. The soldiers' orphan home near Madison has been transferred to the university and sold by the regents. With the proceeds it is designed to furnish an astronomical observatory as soon as the necessary funds for its erection shall be secured. Tuition in the university is free to all students from the state. Since 1867 all departments of the university have been open to women. The academic degrees conferred are those of bachelor of arts, of letters, and of science; and master of arts and letters, and of science. The special and professional degrees comprise those of bachelor of agriculture, of civil engineering, of mining engineering, and of mechanical engineering; those of civil, of mining, and of mechanical engineer, which are conferred upon bachelors of civil, of mining, and of mechanical engineering; and that of bachelor of laws. The university grounds comprise about 400 acres, of which 200 constitute the farm of the agricultural department. The institution has a library of 7,000 volumes, and extensive cabinets and apparatus. In 1875–'6 there were 27 instructors and 345 students.

WISCONSIN RIVER, a tributary of the Mississippi, in Wisconsin. It rises in Vieux Desert lake on the N. E. border, and has a general S. course to Portage City, whence it flows a little S. of W. to its mouth 4 m. below Prairie du Chien. Its entire length is estimated at 600 m. It is navigable by small steamers to Portage City, 200 m. above its mouth. At this point it approaches within 1½ m. of the Fox river, with which it is connected by a canal.

WISDOM, Book of, one of the so-called apocryphal books of the Old Testament. In the Septuagint the book bears the title Wisdom of Solomon, and many of the early church fathers regarded Solomon as its author. This opinion still prevails in the Roman Catholic church, by which the book is held as canonical. It is regarded by almost all Protestant theologians as the work of an unknown Alexandrian Jew, compiled in Greek, between 145 and 80 B. C. It consists of three parts: in the first (ch. i. to v.) the author enjoins wisdom to the rulers of the earth, and praises it as a guide to immortality; in the second (ch. vi. to ix.) he shows by what means wisdom may be obtained, and dwells on its essence and blessings; in the third (ch. x. to xix.) he reviews the effects of wisdom in the history of Israel. A few theologians have ascribed these three different parts to three different authors. There are numerous special commentaries on the book, among others by Bauermeister (Göttingen, 1828) and Grimm (Leipsic, 1837). The best edition of it is in Fritsche's *Libri Apocryphici Veteris Testamenti* (Leipsic, 1871).

WISE. I. A S. W. county of Virginia, bordering on Kentucky, and drained by several small streams; area, about 250 sq. m.; pop. in 1870, 4,785, of whom 68 were colored. The surface is hilly or mountainous, and the soil fertile. Iron ore and bituminous coal abound. The chief productions in 1870 were 6,844 bushels of wheat, 4,443 of rye, 90,187 of Indian corn, 17,953 of oats, 9,842 of potatoes, 75,213 lbs. of butter, 12,482 of wool, and 8,128 of tobacco. There were 779 horses, 1,749 milch cows, 1,981 other cattle, 6,249 sheep, and 6,891 swine. Capital, Wise Court House. **II.** A N. county of Texas, drained by the West fork of Trinity river; area, about 900 sq. m.; pop. in 1870, 3,160, of whom 51 were colored. The surface is undulating, and the soil fertile. The chief productions in 1870 were 5,819 bushels of wheat, 26,750 of Indian corn, 12,570 of oats, 2,575 of sweet potatoes, 14,850 lbs. of butter, 1,302 of wool, and 21 bales of cotton. There were 532 horses, 633 milch cows, 10,336 other cattle, 629 sheep, and 3,164 swine. Capital, Decatur.

WISE, Daniel, an American clergyman, born in Portsmouth, England, Jan. 10, 1813. He came to America at the age of 20, entered the ministry of the Methodist Episcopal church, and became editor of "Zion's Herald" at Boston in 1852. He had previously edited the "Sunday School Messenger," the "Ladies' Pearl," and the "Rhode Island Temperance Pledge." From 1856 to 1868 he was corresponding secretary of the Methodist Sunday school union, after which he continued to edit the "Sunday School Advocate," Sunday school library books, and the tract publications, and was corresponding secretary of the tract society. In 1872 he retired from regular official duties. His publications include "The Path of Life," "The Young Man's Counsellor," "The Young Ladies' Counsellor," "Pleasant Pathways," "Our King and Saviour," "Uncrowned Kings," "The Glen Morris Stories," "The Hollywood Stories," "The Story of a Wonderful Life," "Life of Ulric Zwingli," and "Precious Lessons from the Lips of Jesus."

WISE, Henry Alexander, an American politician, born at Drummondtown, Accomack co., Va., Dec. 3, 1806, died Sept. 12, 1876. He graduated at Washington college, Pennsylvania, in 1825, studied law, and settled in Nashville, but in 1830 returned to Accomack. In 1833 he was elected to congress by the Jackson party, and after the election fought a duel with his competitor. He was twice reëlected. In congress he went over to the opposition on the development of Jackson's bank policy, and took strong ground in favor of slavery. In 1837 he was second to Mr. Graves of Kentucky in his duel with Mr. Cilley of Maine, in which the latter was killed. In 1842 the senate rejected the nomination of Mr. Wise as minister to France, but he was subsequently appointed minister to Brazil, and resided at Rio de Janeiro from May, 1844, till October, 1847. In 1848 and 1852 he supported the democratic candidates for president. He was elected governor of Virginia in 1855, after a very vigorous canvass, directed especially against the "know-nothings." Toward the close of his term occurred the seizure of Harper's Ferry by John Brown, whose execution (Dec. 2, 1859) was one of the last acts of his administration. (See Brown, John.) In February, 1861, he was a member of the state convention, in which, from the committee on federal relations, he made a report which aimed at compromise and a peaceable adjustment with the seceded states. After the secession of Virginia he was appointed brigadier general in the confederate army. His force was driven out of the Kanawha valley by the national troops under Gen. J. D. Cox, and at Gauley bridge lost a large quantity of arms and stores. Subsequently he commanded at Roanoke island, N. C., where his forces were defeated by Burnside's expedition, his son, O. J. Wise, being among the killed.

WISE, Henry Augustus, an American author, born in Brooklyn, N. Y., May 12, 1819, died in Naples, April 1, 1869. He was appointed a midshipman in 1833, served on the coast of Florida during the Seminole war, became a lieutenant in 1845, served in the Pacific, in California, and in Mexico during the Mexican war, was flag lieutenant of the Mediterranean squadron from 1852 to 1855, in 1862 became commander and assistant chief of the bureau of ordnance and hydrography, and in 1867 a captain. He published "Los Gringos" (New York, 1849), a volume of travelling sketches; "Tales for the Marines" (1855); "Scampavias" (1857); and "Captain Brand of the Schooner Centipede" (1864).

WISEMAN, Nicholas, an English cardinal, born in Seville, Spain, Aug. 2, 1802, died in London, Feb. 15, 1865. He received his early education in England, and in 1818 he went to Rome, where he entered the English college, and graduated D. D. at the age of 22. He was ordained to the priesthood in 1825, and appointed professor of oriental languages in the Roman university in 1827, at which time he was also vice rector of the English college, to the rectorship of which he was advanced in 1828. Returning to England in 1835, he soon became celebrated as a preacher and lecturer. In the Lent of 1837 he delivered four lectures in Rome on the office and ceremonies of Holy Week. In 1840 he was made a bishop *in partibus*, and president of St. Mary's college, Oscott. He was appointed vicar apostolic of the London district in 1849. In September, 1850, the pope issued an apostolic letter restoring the English hierarchy, and made Dr. Wiseman archbishop of Westminster, and on the following day a cardinal. These steps gave rise to great excitement in England, and led to a parliamentary enactment against the assumption of local ecclesiastical titles by Roman Catholics. Cardinal Wiseman has published *Horæ Syriacæ* (Rome, 1828); "Lectures on the Connection between Science and Revealed Religion" (2 vols., London, 1836); "The Real Presence" (1836); "Lectures on the Doctrines and Practices of the Catholic Church" (2 vols., 1836); "Four Lectures on the Offices and Ceremonies of Holy Week" (1839); "Three Lectures on the Catholic Hierarchy" (1850); "Essays on Various Subjects" (3 vols., 1853); "Fabiola, a Tale of the Catacombs" (1855); "Recollections of the last Four Popes, and of Rome in their Times" (1858); "Sermons, Lectures, and Speeches during a Tour in Ireland" (Dublin, 1859); "Sermons on Our Lord Jesus Christ, and on His Blessed Mother" (1864); "The Attitude of the Anglican Bishops towards Rationalism and Revolution, a Pastoral" (London, 1864); and "Sermons on Moral Subjects" (1864). Since his death has appeared "Daily Meditation" (Dublin, 1868).

WISHART, George, called "the Martyr," a Scottish clergyman, born about the beginning of the 16th century, burned at the stake at St. Andrews, March 1, 1546. He began to preach about 1536, but in 1538 he left Scotland to avoid persecution, preached at Bristol, England, against the invocation of the Virgin, was condemned therefor, and recanted his opinions. In 1543 he was a tutor in Cambridge, but in July returned to Scotland with the commissioners sent to negotiate a marriage treaty between Prince Edward and the infant queen of Scots. Under their protection he preached at Montrose, Dundee, and other Scottish towns, and his preaching led the people to destroy some convents and Roman Catholic churches. He was arrested at Ormiston by the earl of Bothwell and delivered to Cardinal Beaton, who tried him on his own authority before an ecclesiastical court, and sentenced him to be burned. At the stake Wishart predicted with minuteness the violent and ignominious death of the cardinal, as it occurred three months after. His life has been written by the Rev. C. Rogers (London, 1876).

WISHART, George, a Scottish historian, born in Haddingtonshire in 1609, died in 1671. He is said to have been educated at the university of Edinburgh, and became a parish minister at St. Andrews. Refusing to take the covenant, he was deposed, and was several times imprisoned. He became chaplain to Montrose, and afterward to Elizabeth, the ex-electress palatine, and on the restoration was made rector of Newcastle. He was consecrated bishop of Edinburgh in 1662. He is chiefly known by his "History of the Wars of Montrose" (1st part, in Latin, Paris, 1647; English translation of both parts, London, 1652, 1720).

WISHTONWISH. See PRAIRIE DOG.

WISMAR, a seaport town of Mecklenburg-Schwerin, Germany, on a bay of the Baltic, 18 m. N. of Schwerin; pop. in 1871, 13,883. It has an excellent harbor, over 50 registered vessels, a fine Gothic and five other churches, a new town hall, a gymnasium, a school of navigation, and other public buildings. Machinery, tobacco, and chiccory are the chief manufactures, and grain is the principal export. Wismar was one of the Hanse towns. Under the treaty of Westphalia of 1648 it was annexed to Sweden; in 1803 it was restored to Mecklenburg. The neighboring Wenndorff has been a watering place since 1867.

WISTAR, Caspar, an American physician, born in Philadelphia, Sept 13, 1761, died there, Jan. 22, 1818. He graduated M. D. at Edinburgh in 1786, and became professor of chemistry and physiology in the medical school of Philadelphia. From 1792 he was adjunct, and from 1808 till his death full professor of anatomy and surgery. From 1815 he was president of the American philosophical society. He published "A System of Anatomy" (2 vols. 8vo, Philadelphia, 1811).

WISTARIA, a genus of woody climbers of the family *leguminosæ*. The first species known was our native *W. frutescens*, which was placed by Linnæus in the genus *glycine*, from which on account of marked differences it was removed by Nuttall (1818) and placed in a new genus, dedicated to Prof. Caspar Wistar of Philadelphia. In some nursery catalogues it is still enumerated as *glycine*. Our species is found from West Virginia and Illinois to Florida and Louisiana, in alluvial soils, climbing high upon trees; the pinnate leaves, with 9 to 15 lance-ovate leaflets, are downy when young, as are the young stems; the flowers are in dense hanging racemes 6 in. or more long, appearing in May and June at the ends of the recent shoots; the individual flowers are pea-shaped, with the large roundish standard turned back, bearing two callosities at the base, and the wing petals each have one short and one long appendage at the base; the smooth ovary ripens into a long, knobby pod, containing several seeds about the size of the garden bean. The flowers are usually of a delicate lilac purple, with a slight fragrance; there is a variety with pure white flowers.—The Chinese wistaria (*W. Sinensis*), a favorite in China and Japan, was introduced into England in 1816; it grows more rapidly than the native, and blooms much earlier; the flowers appear when the leaves are but partially developed, and are in longer, looser, more conical clusters than the preceding, and of a paler lilac color. It is largely planted in New York and other cities, where it climbs to the eaves of the tallest houses. There is also a white variety which is a most rampant grower, often extending 20 ft. in a season. A garden variety, called *W. magnifica*, is by some said to be a hybrid between the Chinese and the native, while others regard it as a large-flowered form of the latter, which it resembles in foliage, but has much finer clusters. The short-clustered wistaria (*W. brachybotrys*) is a low-growing Japanese species, with short racemes of large violet-colored flowers. *W. multijuga* has very long, slender, loose-flowered, branching clusters; this, and several others (including a double-

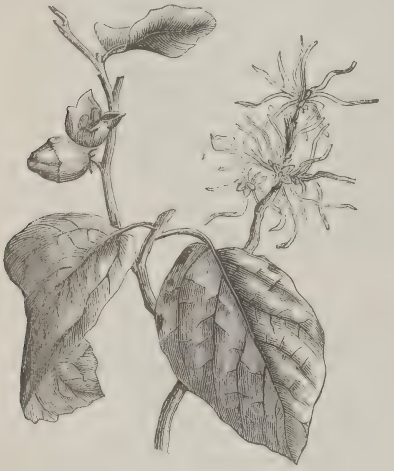
Chinese Wistaria (Wistaria Sinensis).

flowered variety), are of comparatively recent introduction. Though generally allowed to climb, the wistarias may be grown in the form of a pillar or a small tree by training the stems to a stake and properly pinching the growing shoots. The native species may be raised from seeds; the others are multiplied by layering, from cuttings, and the rare varieties by grafting upon the native.

WISTER, Annis Lee, an American authoress, born in Philadelphia about 1840. She is a daughter of the Rev. William Henry Furness, and the wife of Caspar Wister, a physician of Philadelphia. She has translated from the German "Seaside and Fireside Fairies," by Georg Blum and Ludwig Wahl (Philadelphia, 1864); "The Old Mamselle's Secret" (1868), "Gold Elsie" (1868), and "The Countess Gisela" (1869), by Eugenie John (E. Marlitt); "Only a Girl, or a Physician for the Soul," by Wilhelmine von Hillern (1870); and Hackländer's "Enchanting and Enchanted" (1870).

WITCH AND WITCHCRAFT, a person supposed to have formed a compact with Satan, and the practice of the powers thereby acquired. The term witch, though applied to both sexes, in strictness denotes a female, wizard being the appropriate term for a male. The belief in witches, as formerly entertained in Christian countries, supposed Satan to be in rebellion against God and in warfare against the church, and to exercise his malevolent influence through the agency of human beings, who by formal compact had agreed to become his subjects and to serve him. Such persons became possessed of supernatural powers, including the ability to injure others, to read their thoughts, to call up the spirits of the dead, to transform themselves into the likeness of animals, to be present in apparition at a distance from the actual locality of their bodies, to fascinate by a look, &c. They were supposed to bear upon their bodies a "witch mark," affixed by Satan, which was known by the point where it was made becoming callous and dead. —The subject of witchcraft has been treated generally in the articles DEMONOLOGY and MAGIC, and in this article a more particular account of the Salem witchcraft will be given. At the time of the settlement of the country the belief in witches was general, and unknown diseases, extraordinary occurrences, or circumstances not explainable upon known theories, were commonly attributed to the influence of the devil and the agency of witches. Witchcraft was regarded as the blackest of crimes, and the punishment of death was inflicted on persons convicted of it. Several persons were executed as witches in Massachusetts prior to the extraordinary outburst at Salem. The latest instance had been the hanging of an Irish woman in Boston in 1688, accused of bewitching four children belonging to the family of a Mr. Goodwin. During the winter of 1691-'2 a company, consisting mostly of young girls, was in the habit of meeting at the house of the clergyman, Mr. Parris, in Salem Village (now Danvers Centre), for the purpose of practising the arts of necromancy, magic, &c. They soon began to exhibit strange actions, exclamations, and contortions, at times being seized with spasms, dropping insensible to the floor, or writhing in agony. The village physician declared the children bewitched, an opinion in which a council of the neighboring clergymen, including Mr. Parris, concurred. Being pressed to make known who had bewitched them, the girls first accused an Indian woman named Tituba, a servant of Mr. Parris; Sarah Good, a woman of ill repute; and Sarah Osburn, who was bedridden. They were brought before the magistrates for examination on March 1, 1692. The excitement became extreme, and spread through the neighboring country; others were accused, and the most eminent clergymen and laymen encouraged the prosecution, in the belief that Satan was making a special effort to gain the victory over the saints. But few had the wisdom and courage to resist the delusion. A special court of oyer and terminer was appointed for the hearing of the cases, but the trials were a mere mockery. It opened at Salem in the first week of June, and several sessions were held, the last opening on Sept. 9. Nineteen persons, among them some of the most pious and reputable citizens, were hanged, the first executions occurring in June and the last in September. Six were men, including one clergyman, and thirteen were women. Giles Corey, a man upward of 80 years of age, for refusing to plead, was pressed to death. (See PEINE FORTE ET DURE.) A reaction in public sentiment now began to set in, and though at a court held in January, 1693, three persons were condemned, no more executions took place; and in May the governor discharged all then in jail, to the number, it is said, of 150. Mr. Parris, who had been one of the most zealous prosecutors, was dismissed by his church in 1696, although he acknowledged his error.—See "Salem Witchcraft," by Charles W. Upham (2 vols., Boston, 1867).

WITCH HAZEL, or Wych Hazel, a name applied in England to an elm (*ulmus montana*), the leaves of which resemble those of the hazel; the same tree is also called wych elm, its wood having been used to make the chests or boxes for keeping provisions which the old writers called *wyches*. The name wych or witch hazel was transferred by the early settlers to an American shrub or small tree, *hamamelis Virginica*. In naming the genus Linnæus gave it the old Greek name for the medlar, to which the plant bears no resemblance. It gives its name to a small family, the *hamamelaceæ*, which includes several Asiatic genera, and in this country two others besides *hamamelis: Fothergillia*, a southern shrub, and *liquidambar*, one of our finest forest trees. The witch hazel, which is found in damp woods from Canada to Louisiana, is an irregular shrub with long and pliant branches, which sometimes reaches the height of 20 ft., but is usually not over 10 ft.; the alternate obovate or oval, wavy-toothed leaves have straight veins, giving them the appearance of those of the hazel, are slightly downy, and are on very short petioles; the flowers, from buds formed during the summer, open just as the leaves are falling in October or November; they are in clusters of three or four upon a short stalk, with an involucre of three scales; the four-parted calyx is downy; the petals are four, long, narrow, and crumpled; there are four perfect stamens, and four imperfect and scale-like; two styles surmount the downy ovary, which ripens into a downy, two-beaked, two-celled woody pod, each cell containing a large, hard, but edible seed; the pods mature late in the following summer, and often not until flowering time; the pod, bursting elastically, ejects the seeds with considerable force. The wood is white and close, and the bark and leaves contain a large amount of tannin and have been used as astringents; the bark was employed by the Indians as an application to painful tumors, and a fluid extract is used by some practitioners as a local remedy to allay pain. From its unusual time of flowering, the witch hazel forms a conspicuous object in the autumn woods; when the leaves have fallen it appears covered with bright yellow flowers; on account of this peculiarity, the shrub is cultivated in Europe. One other species grows in Japan; the other species accredited to this country are mere varieties of *H. Virginica.*



Witch Hazel (Hamamelis Virginica).

WITHER, George, an English poet, born at Bentworth, Hampshire, June 11, 1588, died in London, May 2, 1667. He studied at Oxford, and in 1613 entered himself at one of the inns of chancery. For his satire, "Abuses Stript and Whipt" (1613), he was thrown into prison, where he composed his poem "The Shepheard's Hunting," and his "Satyre to the King," which, it is said, procured his release. In 1632 he visited the Netherlands, where he published his lyrical version of the Psalms. In 1639 he served as captain of horse in the expedition of Charles I. against the Scottish Covenanters, and in the civil war raised a troop of horse at his own expense and joined the parliamentary forces. He was captured, and was near being hanged, but Sir John Denham procured his release. He was one of Cromwell's major generals, and kept watch over the royalists of Surrey. From their sequestered estates he obtained a fortune, of which he was stripped at the restoration. The convention parliament in Newgate soon after imprisoned him for publishing a seditious and libellous pamphlet entitled *Vox Vulgi.* Sir Egerton Brydges devoted considerable portions of the *Restituta*, *Censura Literaria*, and "British Bibliographer" to the republication of Wither's works, but no considerable collection of them has been made. The list of them in Bliss's edition of Wood's *Fasti Oxonienses* fills 13 columns. A selection of his poems was published by J. M. Gutch in 1820 (3 vols. 12mo, Bristol), and new editions of his "Hymns and Songs of the Church" were issued at Oxford in 1846 and at London in 1856.

WITHERSPOON, John, a signer of the American Declaration of Independence, born in the parish of Yester, Haddingtonshire, Scotland, Feb. 5, 1722, died near Princeton, N. J., Sept. 15, 1794. He was educated at the university of Edinburgh, was licensed to preach in his 21st year, and in 1745 was ordained minister of the parish of Beith in the west of Scotland. He was taken prisoner at the battle of Falkirk, but was released after two weeks' confinement. In 1753 he published anonymously "Ecclesiastical Characteristics, or the Arcana of Church Policy," followed by "A Serious Apology for the Characteristics," in which he avowed himself the author of the work he defended. In 1756 he published an "Essay on Justification," and next year a "Serious Inquiry into the Nature and Effects of the Stage." In 1757 he was installed as pastor of the Low church in Paisley. In 1764 he published three volumes of "Essays on Important Subjects." He became president of the college of New Jersey in 1768, and also professor of divinity and pastor of the church in Princeton. In 1776 he was a member of the provincial congress of New Jersey, and of the continental congress at Philadelphia, where he was one of the most influential advocates of the declaration of independence. He represented New Jersey in congress for six years, and drew up many of the important state papers of that period. He spent his last years on his farm about two miles from Princeton. For some time previous to his death he was totally blind. Editions of his entire works have been published in 4 vols. 8vo. (New York, 1800–'1) and 9 vols. 12mo (Edinburgh, 1804). A colossal statue of Dr. Witherspoon was unveiled in Fairmount park, Philadelphia, in May, 1876.

WITNESS. See Evidence.

WITT, Jan de. See De Witt.

WITTE, Pieter de. See Candido.

WITTEKIND, or Wittikind. See Charles I. (Charlemagne), vol. iv., p. 290.

WITTEN, a town of Prussia, in Westphalia, on the Ruhr, 32 m. W. by N. of Arnsberg; pop. in 1871, 15,160. The population in 1843 was only 3,444, the increase being due to the development of manufactures, chiefly in glass, iron, and steel. There are large coal mines in the vicinity.

WITTENBERG, a fortified town of Prussia, in the province of Saxony, on the Elbe, 53 m. S. W. of Berlin; pop. in 1871, 11,567. It is celebrated for associations with Luther and Melanchthon, who are buried in the *Schloss- und Universitätskirche* by the side of its founder, Frederick the Wise, and of John the Constant. The immense bronze monument of Luther by Schadow stands on the market place in front of the town hall, not far from Drake's statue of Melanchthon, erected in 1865. In 1817 the Augustinian convent where Luther resided was converted into a theological seminary. Luther's theses, originally affixed by him to the doors of the Schlosskirche, were restored in the Latin text on the new bronze doors erected in 1858, the church having been burned during the bombardment of 1760, and again injured by bombardment in 1813, and finally rebuilt in 1817. The other most remarkable church is the Stadtkirche, with Cranach's "Last Supper," introducing Luther, Melanchthon, and Bugenhagen. The town hall contains the same master's "Ten Commandments." The university of Wittenberg, founded in 1502, was united with that of Halle in 1815. The principal educational institution of the present day is a gymnasium.—Wittenberg was founded by Bernard, son of Albert the Bear, duke of Brandenburg, and previous to 1422 was the residence of the dukes and electors of Saxony. In 1547, after the battle of Mühlberg, it was taken by Charles V. In 1760 it was bombarded by the Austrians, and one third of its houses were destroyed. It was restored by the Prussians, and in 1806 it was taken by Napoleon, who rebuilt its fortifications in 1813. In 1814 it was taken after a siege by the Prussians.

WOAD, a plant of the mustard family, *isatis tinctoria*, formerly cultivated for the blue dye yielded by its foliage. The genus *isatis* comprises 25 or 30 species, all of the old world. The woad has been so long in cultivation that its native country is uncertain; it is naturalized throughout Europe, as far north as Sweden, and is occasionally found in old gardens in this country. It is a biennial, from 2 to 4 ft. high, smooth and glaucous, or slightly hairy below; the obovate or oblong radical leaves are coarsely toothed and petioled, the upper sessile and arrow-shaped; the numerous branches are clothed with small yellow flowers, which are succeeded by hanging flat pods, each containing a single seed. The plant requires rich soil, and is sown in drills, after thorough preparation; the foliage is collected when the plant is in flower, the leaves being picked off when their tips turn yellow, and the picking is repeated several times. The leaves, being slightly dried, are ground to a pulp, which is formed into heaps under shelter, but well exposed to the air. As with indigo, the coloring principle is developed by fermentation, which in woad takes place in the heaps, and requires about a fortnight for its completion; the mass, after thorough mixing, is made into cakes by hand or in moulds of one to three pounds each, and these in drying undergo a second partial fermentation, upon the proper management of which the value of the dye greatly depends; in this form it is called by the French *pastel.* Woad was known as a dye or pigment in very early times, and is mentioned by Pliny as *glastum;* it was in use by the ancient Britons to dye their bodies for some religious ceremonies. Before the introduction of indigo the consumption of woad was large; the annual product of Upper Languedoc alone was 40,000,000 lbs. As indigo gives a better color, and one pound of it produces an effect equal to 50 lbs. of wood, it has almost entirely superseded the latter, though woad is still sparingly cultivated for domestic dyeing; its color, though not so fine, is regarded as more permanent than that from indigo.

Woad (Isatis tinctoria).

WOBURN, a town of Middlesex co., Massachusetts, on the Boston and Lowell railroad, 10 m. N. W. of Boston; pop. in 1850, 3,956; in 1860, 6,287; in 1870, 8,560; in 1875, 9,568. It contains 7,750 acres. The surface is diversified, and there are several ponds. From the largest, Horn pond, which covers 150 acres, 40,000 tons of ice are shipped annually. The soil is good. The town is lighted with gas, and is supplied with water through 25 m. of pipe from a spring near Horn pond. The water is pumped into a reservoir holding 6,000,000 gallons, 222 ft. above the pond. A soldiers' monument has been erected in the centre of the town. Many of the inhabitants do business in Boston. The principal industry is the manufacture of leather, in which 30 establishments are engaged, employing about 1,500 men. There are a national and a savings bank. The public schools are graded and are attended by about 2,000 pupils. The high school, founded in 1852, prepares students for college. The Warren academy, founded in 1825, is conducted as a scientific school, and prepares students for the Massachusetts institute of technology. Two weekly newspapers are published. The sum of $200,000 has recently been bequeathed to the town for a library building and art gallery. There are nine churches, viz.: Baptist (2), Congregational (2), Episcopal, Methodist, Roman Catholic, Swedenborgian, and Unitarian.—Woburn was settled from Charlestown in 1640, and was called "Charlestown Village." It was incorporated under its present name in 1642. It is the birthplace of Count Rumford.

WODROW, Robert, a Scottish historian, born in Glasgow in 1679, died March 21, 1734. He was educated at the university of Glasgow, studied theology, and in 1698 became university librarian. In 1703 he was ordained minister of the parish of Eastwood. He published a "History of the Sufferings of the Church of Scotland from the Restoration to the Revolution" (2 vols. fol., Edinburgh, 1721–'2); a life of his father (1828); and a series of memoirs of ministers of the church of Scotland, selections from which were printed for the Maitland club (3 vols., 1834–'45). He left a large collection of manuscripts, chiefly relating to Scottish ecclesiastical affairs, parts of which have been printed by the Wodrow society, established in 1841.

WOFFINGTON, Margaret, commonly called Peg Woffington, an Irish actress, born in Dublin in 1718 or 1719, died March 28, 1760. She was of poor parentage, and when she was about nine years old was one of a company of children who performed in a show booth. A few years afterward she appeared in Dublin, and obtained an engagement at one of the principal theatres, where she played with great success. In 1740 she made her first appearance in London at Covent Garden, where, except for a short time, she continued to perform until her retirement from the stage in 1759. She was remarkably beautiful, and has rarely been excelled as a comic actress. Her early life was exceedingly loose, but she reformed, and became simple in her tastes and habits, devout, and respectable.

WÖHLER, Friedrich, a German chemist, born at Eschersheim, near Frankfort, July 31, 1800. He studied at the gymnasium of Frankfort, where chemical experiments became a passion with him, and at the university of Marburg, where he succeeded in preparing some iodide of cyanogen, without being aware that Sir H. Davy had anticipated him in the discovery. After spending one year at Marburg, he went to Heidelberg, where in Gmelin's laboratory he prepared cyanic acid, an account of which was published in Gilbert's *Annalen.* He graduated as doctor of medicine and surgery in September, 1823, and spent a year in chemical investigations in the laboratory of Berzelius in Stockholm. In 1824 he made the tour of Sweden and Norway with Berzelius and Alexandre and Adolphe Brongniart. He returned to Frankfort in October, and undertook to continue the translation of Berzelius's *Jahresbericht* which Gmelin had begun. There he met Liebig, in association with whom he carried on many of his most important researches. On the foundation of the *Gewerbschule* in Berlin in March, 1825, Wöhler was appointed instructor in chemistry, and in 1827 he was made professor. He resigned in 1831 and removed to Cassel, where he occupied himself with the translation of the third edition of Berzelius's *Lehrbuch der Chemie*, and with the *Jahresbericht.* The large supply of arsenical nickel which had accumulated as an incidental product at some chemical works in Hesse-Cassel attracted his notice, and he soon devised a plan for reclaiming the nickel, which has since proved of great practical value. While residing in Cassel he aided in establishing the *Gewerbschule* of that city, and he held the chair of chemistry in it for several years. In 1836 he was appointed professor of chemistry at the university of Göttingen, where he still remains (1876). He has been seven times elected dean of the medical faculty, and in 1860 was appointed permanent secretary of the royal Hanoverian academy of sciences. In 1873 the 50th anniversary of his doctorate was celebrated at the university, and in 1875 the 50th year of his active career as a teacher and the 75th year of his age. The principal published works of Wöhler, besides the above mentioned translations from Berzelius, are his *Lehrbuch der Chemie*, *Grundriss der unorganischen Chemie*, *Grundriss der organischen Chemie*, and *Mineral-Analyse in Beispielen.* From 1836 he was associated with Liebig as editor of the *Handwörterbuch der Chemie*, and from 1838 of the *Annalen der Chemie und Pharmacie.* During the last 50 years he has published in Gilbert's, Poggendorff's, and Liebig's *Annalen* more than 250 papers on chemical subjects. Among his principal discoveries are the isolation of aluminum in 1827, of glucinum and yttrium in 1828, the artificial production of formic acid in 1829, and his investigations on nickel in 1832. But his most important contribution to science was the artificial production of urea in 1828. This was the first instance of the preparation of an organic compound by synthesis, and may be said to have laid the foundation of modern research in organic chemistry.

WOLCOTT, John, an English satirist, better known as Peter Pindar, born at Dodbroke, Devonshire, in 1738, died Jan. 14, 1819. He studied medicine, and in 1767 went to Jamaica as medical attendant to Sir William Trelawney, the governor. Though an avowed unbeliever, with his patron's promise of a living, he returned to England to be ordained. The living did not fall vacant, and he was forced to accept a small curacy in Jamaica until the governor's death in 1768. He then returned to England, resided in London, ridiculed the royal academy in his "Lyric Odes," and became a professed satirist. His verses brought him a good income, until the government bought his silence by a pension. Collections of his writings appeared between 1789 and 1812.

WOLCOTT. I. Roger, a colonial governor of Connecticut, born in Windsor, Conn., Jan. 4, 1679, died in that part of the same town which is now East Windsor, May 17, 1767. He was appointed commissary of the Connecticut colonial forces in the attack on Canada in 1711, and served in the subsequent French wars, attaining the rank of major general at the siege of Louisburg in 1745. He was elected governor of the colony in 1751, and reëlected for the next three years. He had previously been repeatedly member of the assembly and of the council, judge of the county court and of the superior court, and deputy governor. He published "Poetical Meditations" (1725), and wrote a poem entitled "A Brief Account of the Agency of the Honorable John Winthrop, Esq., in the Court of King Charles II., A. D. 1662," in which he gives a description of the Pequot war. This has been printed in the collections of the Massachusetts historical society. **II. Oliver,** a signer of the Declaration of Independence, son of the preceding, born in Windsor, Conn., Nov. 26, 1726, died in Litchfield, Dec. 1, 1797. He graduated at Yale college in 1747, received a captain's commission from the governor of New York, and raised a company for the defence of the northern frontier, where he remained until the peace of Aix-la-Chapelle. In 1751 he was appointed sheriff of Litchfield co., Conn., and in 1774 a member of the state council. He was also chief judge of the court of common pleas, a judge of the probate court, and a major general of militia. In 1775 he was appointed one of the commissioners of Indian affairs for the northern department. In 1776 he commanded the 14 Connecticut regiments raised to act with the army in New York, and in the same year he took his seat in congress. After the declaration was signed he returned to the army, and was at the battle of Saratoga, but continued to serve in congress at intervals till 1783. He was lieutenant governor of Connecticut from 1786 to 1796, when he was elected governor, which office he held at the time of his death.—His son OLIVER (1760–1833), a lawyer, was secretary of the United States treasury 1795–1800, afterward circuit judge till 1802, and from 1818 to 1827 governor of Connecticut.

WOLF, the typical form of the *canidæ* or dogs, whose family characters have been described under DOG. The European wolf (*canis lupus*, Linn.) is about 4 ft. long, with a tail of 16 in., and is commonly yellowish gray above and dirty yellowish white below; it is about the size of a large dog, but leaner and more gaunt, and with a wicked expression of countenance from the obliquity of the eyes; the pupils are round, the ears erect, and the tail carried nearly straight and hanging down. It is cowardly but powerful, hunting deer and animals of that size in packs, often committing great ravages among sheep, calves, and the smaller domestic animals, but rarely attacking man unless rendered fearless by hunger; it is very cautious and difficult to entrap, except when food is very scarce. It was formerly common over most of Europe, but is now so only in the most unfrequented and mountainous regions of N. Europe and Asia. Its osteological and anatomical characters are almost identical with those of the dog, and the period of gestation the same. When taken young it has been successfully tamed. A species of wolf is represented with the dog on Egyptian monuments, and is figured on tombs of the fourth dynasty, 4,000 years ago. It becomes almost white in Sweden and Siberia.—In North America there are two well marked sections of wolves; in the smaller, to which the prairie wolf belongs, the skull is slender and the muzzle elongated and fox-like, with not very prominent cranial crests; in the other, containing the large wolf, the skull is higher, with larger crests, broader muzzle, and relatively smaller orbits. Some rank the South American fox-like *canidæ* among the wolves, comprising the genera *lycalopex* and *pseudalopex* of Burmeister. The North American or common gray wolf (*C. occidentalis*, Rich.) is usually grayish above, with a mixture of black points giving a grizzled appearance, and lighter or yellowish gray below; it varies from this to nearly white, and is hence called *C. variabilis* by Prince Maximilian; it is from 3¾ to 4½ ft. long, with a tail of 17 to 20 in. It is stouter than the European wolf, with wider muzzle, larger head, more arched forehead, shorter ears and legs, longer and finer hair, and more bushy tail;

European Wolf (Canis lupus).

many authors consider it a permanent variety of the European species, while others not only regard it as distinct, but make several species of it. Among the varieties which have received names are the white wolf on the upper waters of the Missouri, the dusky in the northwestern states, the black in the south, and the rufous in Texas; these vary also in shape, being more slender and longer-legged at the south. The giant wolf described by Townsend, from Oregon, was probably only a very large specimen of the common gray species. Gray wolves were formerly abundant all over North America; in the far west they follow the trail of the buffalo herds, picking up the sick and straggling or feeding on the refuse of the hunters; they also run down deer in packs, and occasionally attack and devour horses, and man himself, when furious with hunger. In the middle and New England states a few still linger in the mountainous districts, especially where there are deer. The wolf has four to nine young at a time in the spring, which it protects in burrows; it crosses with domestic dogs, and the Indians try to improve their sledge dogs in this way; it can hardly be distinguished from these dogs except by its superior size and strength; the howl is much like that of the dog.—The prairie wolf (*C. latrans*, Say), the coyote of the Mexicans, is intermediate in size between the fox and the wolf, having the sharp muzzle of the former and the shape and tail of the latter; it is the American representative of the old world jackal. It is 36 to 40 in. long, with a tail of 16 to 18 in.; the color is usually dull yellowish gray on the back and sides, with black cloudings; under parts and inside of limbs dirty white; the ears very large, triangular, erect, and mostly coated with hair; there are four toes on each foot, and on the fore feet a sharp claw on the inside, 2 in. above the sole, attached to the rudimentary thumb; tail bushy but tapering, and the hair coarse. The voice is a kind of snapping bark, whence the name of barking wolf. It is found on the plains of the Missouri and the Saskatchewan, extending from Mexico to lat. 55° N.; it lives and breeds in burrows, having the young, sometimes 10, in April; it hunts in packs, and is very fleet.

Coyote or Prairie Wolf (Canis latrans).

WOLF, Christian von, baron, a German philosopher, born in Breslau, Jan. 24, 1679, died in Halle, April 9, 1754. He graduated at Leipsic in 1703, and subsequently lectured there. In 1706 the invasion of Charles XII. drove him from that city, and in 1707 he became professor of mathematics and natural history at Halle. In 1723, having been accused by his theological colleagues of heterodoxy, he was deprived of his place by Frederick William I. and summarily expelled from the country. This gave rise to great agitation, and his services were sought in many seats of learning, after he had accepted a professorship at Marburg. In 1740, after the accession of Frederick the Great, he was reinstated at Halle, and was made vice chancellor of the university, privy councillor, and professor of natural and international law. In 1743 he was made chancellor of the university, and in 1745 baron. Wolf systematized and extended, but partly also modified, the theories of Leibnitz, and the Leibnitzo-Wolfian philosophy ruled Germany during the 18th century until the time of Kant. The works of Wolf in German (*Vernünftige Gedanken*, 7 vols., 1712–'33) and Latin (22 vols., 1728–'50) treat of all the branches of philosophy excepting æsthetics, which was first developed by his pupil Baumgarten. His systematic philosophical treatises are: *Philosophia Rationalis* (1728); *Psychologia Empirica* (1728); *Philosophia Prima, sive Ontologia* (1730); *Cosmologia Generalis* (1731); *Philosophia Moralis* (1732); *Psychologia Rationalis* (1734); *Theologia Naturalis* (1736–'7); and *Philosophia Practica Universalis* (1738–'9). His chief mathematical writings are included in *Elementa Matheseos Universæ* (5 vols. 4to, 1732–'41). His other publications include *Jus Naturæ* (8 vols., 1740–'48) and *Jus Gentium* (1749).—See Ludovici, *Ausführlicher Entwurf einer vollständigen Historie der Wolf'schen Philosophie* (3 vols., Leipsic, 1737), and Wolf's autobiography, edited by Wuttke (1841).

WOLF, Friedrich August, a German scholar, born at Hainrode, near Nordhausen, Feb. 15, 1759, died in Marseilles, Aug. 8, 1824. He studied and gave private lessons at Göttingen, and in 1778 published an edition of "Macbeth." In 1779 he became a teacher at Ilfeld, in 1782 rector of the public school at Osterode, and in 1783 professor of philosophy and director of the pedagogic institute at Halle. When the university of Halle was closed in 1806, Wolf went to Berlin, and participated in the establishment of the university there, and for a time was employed in the ministry of public instruction. He stood at the head of German classical scholars, and was equally distinguished as a lecturer and a writer. His most celebrated work is *Prolegomena ad Homerum* (1795) (see HOMER, vol. viii., p. 779), and he edited Homer, Demosthenes, Cicero, Plato, and other ancient authors.—See Arnoldt, *Wolf in seinem Verhältnisse zum Schulwesen und zur Pädagogik* (2 vols., Brunswick, 1861–'2).

WOLFE, an E. county of Kentucky, bounded S. by the N. fork of Kentucky river and drained by Red river, one of its tributaries; area, about 170 sq. m.; pop. in 1870, 3,603, of whom 28 were colored. The surface is generally hilly and broken; the soil in parts is fertile. The chief productions in 1870 were 4,145 bushels of wheat, 106,152 of Indian corn, 15,734 of oats, 72,121 lbs. of butter, and 452 tons of hay. There were 629 horses, 860 milch cows, 1,401 other cattle, 3,874 sheep, and 3,419 swine. Capital, Campton.

WOLFE, a S. county of Quebec, Canada; area, 665 sq. m.; pop. in 1871, 8,823, of whom 7,504 were of French, 748 of English, and 458 of Irish origin or descent. It is drained by the St. Francis river and other streams. Capital, Dudswell.

WOLFE, Charles, a British poet, born in Dublin, Dec. 14, 1791, died in Cork, Feb. 21, 1823. He graduated at Trinity college, Dublin, in 1814, was a tutor there, took orders in 1817, and was a curate at Ballyclog and afterward at Donoughmore, county Tyrone. After visiting the south of France in the pursuit of health, he died of consumption. His literary "Remains," with a memoir, was published in 1825 by Archdeacon Russell. His best known production is his celebrated ode on the burial of Sir John Moore.

WOLFE, James, an English general, born at Westerham, Kent, Jan. 2, 1726, killed before Quebec, Sept. 13, 1759. He entered the army as a second lieutenant at the age of 15, and took part in the battles of Dettingen, Fontenoy, Falkirk, Culloden, and Lawfeldt. In 1757 he was a colonel in the expedition against Rochefort. In 1758, with the rank of brigadier general, he accompanied the expedition to Cape Breton, and took a distinguished part in the reduction of Louisburg, after which he returned to England. Pitt, then planning the overthrow of the French dominion in North America, selected him to command an expedition against Quebec, made him major general, and gave him 8,000 men and a strong fleet. On June 27, 1759, he landed on the isle of Orleans, where he erected batteries; but his fire upon the city from there and from batteries at Point Levi did little damage, and the ships from their great draught were unable to coöperate. In addition to the almost impregnable defences of the city, new works had been erected by Montcalm, the French commander, who had there concentrated the entire available forces of the province. Wolfe moved to the mouth of the Montmorency and assaulted the French works, but was repulsed with severe loss. July and August were spent in fruitless efforts to reduce these works. On the night of Sept. 12, when his force was greatly reduced by losses, sickness, and the necessity of leaving garrisons at Point Levi and the isle of Orleans, Wolfe took 3,600 men in boats to a point two miles above Quebec, and before daylight ascended the heights of Abraham, which commanded the city from the west. At 10 o'clock Montcalm, most of whose men were raw provincials, confronted him, and began a sharply contested engagement, in which at length the French gave way. The successful general died of his wounds just as the victory was decided. Montcalm also was fatally wounded, and died the next day. Five days after the battle Quebec surrendered, and Canada was lost to France. Wolfe's remains were carried home and interred in the parish church of Greenwich, parliament voting a monument to him in Westminster abbey. In the government gardens of Quebec there is an obelisk 60 ft. high to the memory of both Wolfe and Montcalm. Wolfe's life has been written by Robert Wright (London, 1864).

WOLFENBÜTTEL, a city of Germany, in the duchy of Brunswick, formerly the residence of the dukes, on the Ocker, 8 m. S. of Brunswick; pop. in 1871, 10,457. It is in a marshy region, and has a citadel, four churches, and a library of 200,000 volumes. Lessing, when librarian there, edited a manuscript belonging to it, the "Wolfenbüttel Fragments," against the supernatural origin of Christianity, which was proved to have been written by Reimarus. (See BRUNSWICK, and BRUNSWICK, HOUSE OF.)

WOLFF, Albert, a German sculptor, born in Neu-Strelitz, Nov. 14, 1814. He studied in Berlin and in Italy. He assisted his teacher Rauch in various works, and after his death completed his marble group of "Moses." In 1866 he became professor at the Berlin academy of fine arts. His works include colossal statues of Frederick William IV. at Königsberg and of Frederick William III. at Berlin, the statue of Galileo for the university of Pesth, and many others, remarkable for classic taste.

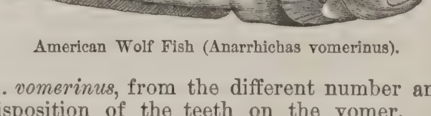
WOLFF, Emil, a German sculptor, born in Berlin, March 2, 1802. He studied under his uncle Gottfried Schadow, and at Rome, where his mythological and genre statues made him prominent. His most popular work in Germany represents a young fisherman of remarkable beauty. His finest busts are those of Thorwaldsen, Niebuhr, Bunsen, and the English royal family. He became a professor in the academy of fine arts in Berlin.

WOLFF, Joseph, a clergyman of the church of England, of Jewish parentage, born at Weilersbach, near Bamberg, Germany, in 1795, died at Isle Brewers, Somersetshire, May 2, 1862. He studied at Munich, Weimar, and Vienna, passed a year in the family of Count Stolberg at Frankfort, and in 1815 went to Rome and was baptized in the Catholic church, but was afterward dismissed for heresy. He now went to England, united with the English church, spent two years at Cambridge studying oriental languages, and in April, 1821, embarked for Gibraltar. He travelled extensively in the East, returned home by way of Circassia, the Crimea, and Constantinople, and reached Dublin in May, 1826. In February, 1827, he married a daughter of the earl of Orford, and in

April, accompanied by his wife to Malta, set out on another missionary tour in the East, where, among other adventures, he was taken prisoner and sold as a slave, but finally reached Bokhara. After three months' labor among the Jews there, he started for India, passed through Afghanistan, the Punjaub, and Cashmere, and reached Calcutta in March, 1833. Thence he went to Hyderabad and Cochin, visited the Jews of that region and of Goa, and sailed from Bombay for Arabia. He spent some time in Abyssinia, acquired the Amharic language, and returned to England *via* Malta in the summer of 1834. In 1836 he again visited Abyssinia, where he was hailed by some of the natives as their new *abuna* or patriarch, visited the Rechabites of Yemen, met a party of Wahabees in the mountains of Arabia, who horsewhipped him because they could find nothing about Mohammed in the Arabic Bibles he had given them, and in 1837 sailed for Bombay, and thence to New York, where he arrived in August. Here he received deacon's orders in the Protestant Episcopal church, then visited the principal cities of the United States, preached before congress, and in January, 1838, returned to England. He next visited Dublin, received priest's orders, and was settled as curate, first at Linthwaite and then at High Hoyland in Yorkshire. In 1843, when the news of the imprisonment of Col. Stoddart and Capt. Conolly (a personal friend) at Bokhara reached England, he offered to attempt their release or learn their fate. The British government were unwilling to send him officially, but individuals furnished the means. Dressed in his doctor's hood, clergyman's gown, and shovel hat, with a Bible in his hand, and announcing himself as "Joseph Wolff, the grand dervish of England, Scotland, and Ireland, and of the whole of Europe and America," he made his way through Persia to Bokhara. He had previously learned that Stoddart and Conolly had been beheaded, and he was himself made a prisoner and condemned to death; but on the day fixed for execution the Persian ambassador interfered, and he was enabled to make his escape, and to avoid the assassins sent after him. He arrived in England in 1845, and settled as parish priest in the little hamlet of Isle Brewers, where he spent the rest of his life. He published "Journal of Missionary Labors" (1839), "Mission to Bokhara" (1845), and "Travels and Adventures of Rev. Joseph Wolff, D. D., LL. D." (2 vols. 8vo, 1860).

WOLFF, Wilhelm, a German sculptor, born at Fehrbellin, Brandenburg, April 6, 1816. He is called Thierwolff, to distinguish him from Emil Wolff, and on account of his sculptures of animals. Among these are a buffalo struggling with wolf dogs; a lion startled by a serpent and combating it; "The Lion's Ride," after Freiligrath's poem; and a bacchante playing with a panther. His other productions comprise a colossal bust of Herder, statues of the elector Joachim II. and the electress Louisa Henrietta, and a large bust of Sebastian Bach.

WOLF FISH (*anarrhichas lupus*, Linn.), a spiny-rayed fish allied to the blenny family, and inhabiting the seas of northern Europe and America. It attains a size of 3 to 5 ft. or more; the color is purplish brown above, with 10 to 12 transverse black or brown stripes extending more or less over the whitish lower parts; the dorsal fin extends from behind the head almost to the caudal, and the anal is half as long, bringing the vent very far forward; the pectorals are very large, the caudal rounded, and the ventrals absent; the body is compressed, with small scales covered by a slimy skin; head cat-like and rounded in front; the stomach is short and fleshy, the diameter of the intestines uncommonly large, the gall bladder enormous, the brain very small, and the air bladder absent. The teeth differ from those in most other fishes, not being attached directly to the jaws, but to bony processes connected with them by suture, and are therefore easily broken off; they are strong, conical, and like canines in front, and rounded tubercles posteriorly and on the vomer and palate; the tongue is thick and angular, adapted for directing the food between the powerful jaws; the lips are loose and fleshy. Few fishes have so savage an appearance, and few fight so fiercely when caught; they live a long time out of water. Their food consists of crustaceans, mollusks, and echinoderms, whose shells are easily crushed and are voided almost unchanged; they swim rapidly along the bottom, with an undulating motion, and are very active and destructive to nets. In the European seas the wolf fish is found from the English channel northward, being very abundant about Iceland; its flesh is said to be exceedingly good, much like that of the eel, and is highly esteemed in Iceland, where it is used fresh and salted; the skin is converted into a kind of shagreen used for bags and pouches, and the bile is employed as soap. The generic name is derived from the unfounded supposition that it climbs rocks by its fins and tail.—The American species, found from New York to Greenland, has been considered distinct by Agassiz, and named by him *A. vomerinus*, from the different number and disposition of the teeth on the vomer. It grows from 3 to 5 ft. long, with a weight of 5 to 30 lbs.; it is caught all the year round by the cod fishers, but mostly in the winter, and especially on the Cusk rocks between Boston and Cape Ann; the fishermen generally call it "sea cat." Though its hideous appearance and slimy skin lead to its being in many instances


American Wolf Fish (Anarrhichas vomerinus).

thrown away, specimens from 5 to 10 lbs. are very fine eating, especially when broiled after the skin is removed; many are split, salted, and smoked for future use.

WOLFRAM. See TUNGSTEN.

WOLLASTON, William, an English author, born at Coton-Clanford, Staffordshire, March 26, 1659, died in London, Oct. 29, 1724. He was educated at Cambridge, and in 1681 became assistant master, and in 1686 head master, of Birmingham school. In 1688 he inherited an estate and removed to London. His most celebrated work, "The Religion of Nature Delineated," was published in 1724.

WOLLASTON, William Hyde, an English natural philosopher, born Aug. 6, 1766, died in London, Dec. 22, 1828. He received the degree of M. D. at the university of Cambridge in 1793, practised medicine for some time at Bury St. Edmunds, and then removed to London, where he devoted himself almost exclusively to chemical and physical investigations. His important researches were mainly embodied in a series of papers published in the "Philosophical Transactions," and embrace almost the entire range of physical science. He early maintained the chemical doctrine of galvanic action, and was the first to demonstrate the identity of galvanism and frictional electricity. As a result of his experiments on the ores of the more refractory metals, he determined a process (known as the Wollaston process) of isolating platinum in a pure state, and in 1803 discovered in association with the ore of that metal palladium and rhodium. He subsequently devised a means of rendering platinum malleable, by which he acquired great wealth, and for which he received the royal medal of the royal society shortly before his death. To him is due the discovery of the dark or Fraunhofer lines in the solar spectrum, the existence of which he detected in 1802 while viewing a beam of sunlight through an ordinary glass prism. (See SPECTRUM ANALYSIS.) Among his more important scientific inventions are the double plate and thimble galvanic batteries, the latter so minute as to be embraced in the compass of a thimble; the sliding rule of chemical equivalents; the camera lucida; the reflecting goniometer for measuring the angles of crystals; and the cryophorus, whereby water is frozen by means of its own evaporation. He also improved the construction of the microscope by introducing the Wollaston doublet or compound lens. In 1806 he was elected secretary, and in 1820 president of the royal society.

WOLLSTONECRAFT, Mary. See GODWIN, MARY WOLLSTONECRAFT, vol. viii., p. 64.

WOLOWSKI, Louis François Michel Raymond, a French economist, born in Warsaw, Aug. 31, 1810, died Aug. 4, 1876. He studied in France, took part in the Polish revolution of 1830, settled in Paris, and founded in 1833 the *Revue de législation et de jurisprudence.* In 1834 he was naturalized, and subsequently he married a sister of Léon Faucher. In 1839 he became law professor at the *conservatoire des arts et métiers*, and in 1848 a member of its council; and he was elected to the constituent and subsequently to the legislative assembly, retiring in 1851. He then resumed his professorship, and founded the first *crédit foncier* bank, ultimately known as the *crédit foncier de France.* In 1855 he succeeded Blanqui in the academy of moral and political sciences. On July 2, 1871, he was elected in Paris to the national assembly, and in 1872 was adjoined to the superior council of commerce, agriculture, and industry. He is known as an opponent of Thiers's protectionist views. His works include *De l'organisation du travail* (1845); *Études d'économie politique et de statistique* (1848); *De l'organisation du crédit foncier* (1849); *Henri IV. économiste: Introduction de l'industrie de la soie en France* (1855); *Introduction de l'économie politique en Italie* (1859); *Les finances de la Russie* (1864); *La banque d'Angleterre et les banques d'Écosse* (1867); *La liberté commerciale et les résultats du traité de commerce de* 1860 (1868); and *L'or et l'argent* (1870).

WOLSELEY, Sir Garnet Joseph, a British soldier, born in county Dublin, Ireland, in 1833. He entered the army in 1852, and served in Burmah, in the Crimea, in India during the sepoy mutiny of 1857-'8, and in China in 1860. For several years after 1867 he was stationed in Canada; in 1870 he was knighted. In 1874, as chief commander, he ended the Ashantee war, entering Koomassie Feb. 4, and receiving the submission of King Koffee. In 1874, after his return to London, he declined a title, but received the brevet of lieutenant general, a parliamentary grant of £25,000, and the liberties of the city of London, with a valuable sword. Subsequently he was for some time governor of Natal, and in 1878 of Cyprus.

WOLSEY, Thomas, an English prelate, born in Ipswich in 1471, died in Leicester, Nov. 29, 1530. He graduated at Oxford, was elected a fellow, received holy orders, and obtained the living of Lymington, Somersetshire. About 1506 he became chaplain to Henry VII., and afterward was intrusted with a secret mission to the emperor Maximilian. His dexterity in this employment was rewarded with the rich deanery of Lincoln. Henry VIII., shortly after his accession, appointed him his almoner. During the war he went with the king to France, and after the capture of Tournay (1513) became administrator of that see. Suitors at court now eagerly bought his patronage, and he grew rich rapidly. Before the end of 1514 he was archbishop of York. In September, 1515, Leo X. made him a cardinal, hoping through his influence to gain the aid of Henry against the French. Three months later he was created lord chancellor of England, and in 1518 received from Leo the appointment for two years of legate *a latere;* and receiving successive prorogations and additional powers, he at length exercised within the realm nearly all the prerogatives of the sovereign pontiff. Besides the regular emoluments of his offices, he farmed the revenues of the sees of Hereford and Worcester, held *in commendam* the abbey of St. Albans and the bishopric of Bath, and drew besides large revenues from continental benefices. His household comprised from 500 to 800 persons, among whom were knights and barons, and the sons of many distinguished families. He built the magnificent palace of Hampton Court, and gave it to his sovereign. He had the tact to govern the state without letting Henry know it; and while the king took a personal share in all important state affairs, it was Wolsey who directed them. He was constantly informed of the secret proceedings of the continental courts, and so skilfully preserved the balance of power between France and the house of Austria that he was feared and courted by popes and princes, while the king held the position of arbiter of Europe. After the death of the emperor Maximilian (1519), Henry VIII., Francis I., and Charles of Spain, Maximilian's grandson, became candidates for the imperial throne, and both Henry and Francis held out to Wolsey the prospect of the papacy in the event of their success. He was disappointed by the election of Charles. In 1520 he was commissioner to arrange the meeting between the kings of France and England on the "field of the cloth of gold." Wolsey remained two days with the king of France, the result being a new treaty with England. In the following year he was chosen arbitrator between Charles and Francis, and took the opportunity to visit the emperor at Bruges and arrange a secret treaty for a joint invasion of France. When the war began, he was charged with the task of raising money. On the death of Leo X., and again on that of Adrian VI., he aspired to the tiara, but the French cardinals prevented his election. The doctrines of Luther were now beginning to disturb the Christian world, and Wolsey entered warmly into his sovereign's projects for suppressing them in England. The part taken by him in the king's endeavors to obtain divorce from Catharine of Aragon, while it pleased no one, brought upon him the enmity of Anne Boleyn and her family. (See HENRY VIII., and ANNE BOLEYN.) Anne extorted a promise from her royal lover never more to speak with the cardinal; and on Oct. 9, 1529, the attorney general filed two bills in the king's bench charging him with having as legate transgressed the statute of *præmunire.* Wolsey ordered his attorney to plead guilty, resigned the great seal (Oct. 17), transferred to the king the whole of his personal estate, valued at 500,000 crowns, and the yearly profits of his ecclesiastical benefices, and then retired to Esher, a seat belonging to his bishopric of Winchester. Through the lingering friendship of the king, Wolsey was ultimately allowed to retain the administration of the diocese of York, and received a general pardon and an annuity of 1,000 marks. After a short residence at Richmond, he was commanded in April, 1530, to retire to the limits of his archbishopric. Here his thoughts seemed devoted to the duties of his station, but his enemies at court were not idle. On Nov. 4 he was arrested at Cawood on a charge of high treason, and conducted toward London. He was suffering from dropsy, and the journey was necessarily slow. As he entered the monastery of Leicester he said to the abbot: "Father abbot, I am come hither to leave my bones among you." He was at once carried to bed. The second day, seeing the lieutenant of the tower in his chamber, he said to him: "Master Kyngston, if I had served God as diligently as I have done the king, he would not have given me over in my gray hairs. But this is the just reward that I must receive for my diligent pains and study that I have had to do him service; not regarding my service to God, but only to satisfy his pleasure." He expired the next morning. Wolsey was a man of some learning and a munificent patron of letters. He heaped preferment on native scholars, invited the most eminent foreigners to teach in the English universities, established at Oxford seven lectureships, and founded Christ Church college at the same university, besides a college at Ipswich intended as a nursery for it.—His life was written by Cavendish, his gentleman usher (London, 1641). See also "Lives of the English Cardinals," by Folkestone Williams (2 vols., London, 1868); "Letters and Papers, Foreign and Domestic, of Henry VIII.," from the public record office, edited by J. S. Brewer (rolls series, vol. iv., part i., 1870; part ii., 1872; introduction and appendix, 1875).

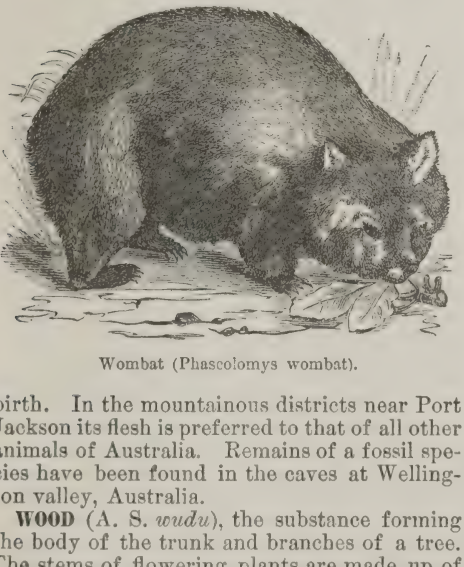
WOLVERENE. See GLUTTON.

WOLVERHAMPTON, a town of Staffordshire, England, 12 m. N. W. of Birmingham; pop. in 1871, 68,279. It is in the centre of the great midland coal and iron district, and has manufactures of iron, steel, and brass. The annual manufacture of finished iron is about 900,000 tons; tin and iron japanned goods and articles in papier maché are also manufactured.—In 996 Wulfrune, sister of Ethelred II., endowed a church and college here. The town was then called Hampton, and afterward Wulfrune's Hampton, which became Wolverhampton.

WOLZOGEN, Karoline von (VON LENGEFELD), a German authoress, born in Rudolstadt, Feb. 3, 1763, died in Jena, Jan. 14, 1847. When scarcely 16 years old she married the privy councillor Von Beulwitz, but was soon separated from him, and in 1796 married the chancellor of the court of Weimar, Baron Wilhelm von Wolzogen. Her brothers had been Schiller's fellow pupils, and he became a guest of the family at Bauerbach, and subsequently married her sister Charlotte. Her first anonymous work, *Agnes von Lilien* (2 vols., Berlin, 1798), was thought to be the production of Goethe. Her other works include *Erzählungen* (2 vols., Stuttgart, 1826–'7); *Schiller's Leben* (2 vols., 1830; new eds., 1845 and 1851); *Cordelia* (2 vols., Leipsic, 1840; 2d ed., 1845); and *Literarischer Nachlass* (2 vols, 1848–'9; 2d ed., 1867).

WOMAN'S RIGHTS, a question involving the political, industrial, educational, and general social status of women, and their legal rights and disabilities. It embraces topics treated under ALIMONY, DIVORCE, HUSBAND AND WIFE, MARRIAGE, and MARRIAGE SETTLEMENTS, and a popular movement which demands for women the same public rights and opportunities that are enjoyed by male citizens. This movement began in the United States in the middle of the present century, in connection with the anti-slavery agitation, with which it at first identified itself. The first conventions were held at Seneca Falls and Rochester in 1848, under the auspices of Elizabeth Cady Stanton, Amelia Bloomer, Mrs. Stebbins, and Frederick Douglass. Among other early advocates of the cause were Lucretia Mott, Paulina Wright Davis, Ernestine L. Rose, Frances D. Gage, and Sarah Tyndale. In 1851 Susan B. Anthony presided at a convention in Syracuse, with the coöperation of Lucy Stone and Antoinette L. Brown. Annual conventions assembled at New York from 1852 till the outbreak of the civil war. In 1863 Miss Anthony organized the "Loyal Women's League." Among other subsequent bodies was the "American Suffrage Association," chiefly in the New England states, of which Mary A. Livermore and Julia Ward Howe were the principal founders. The "National Woman's Suffrage Association" opened its ninth annual meeting in New York, May 10, 1876. Mrs. Matilda Joslyn Gage proposed a woman's declaration of independence for July 4, 1876. Mrs. Stanton was elected president for the ensuing year, and Lucretia Mott and others vice presidents, representing every state in the Union. The other officers were Miss Anthony, Laura Curtis Bullard, Lillie Devereux Blake, Ellen C. Sargent, and Jane Graham Jones. The elective franchise and the right to sit on juries were granted to women in Wyoming territory, Dec. 10, 1869, and the former in Utah in 1870. The constitutional amendment for female suffrage was adopted in Iowa in 1876 by the house, and was barely defeated in the senate. In that state women have been for several years appointed notaries public, and chosen directors in school districts and county superintendents of common schools. The legality of their tenure of the last office, being contested, was finally confirmed in 1876 by both branches of the legislature, with but few dissenting votes. The discussion of female political rights was recently revived in the legislature of New York. The many petitions lately presented to various legislative bodies included one by the women of the District of Columbia to the house of representatives on March 31, 1876, the centennial anniversary of an application said to have been made by Mrs. Abigail Adams to her husband, John Adams, urging him to shape the organic laws so as to enable women to protect their own rights. In several states women who pay school taxes are allowed to vote at school meetings. Illinois admits them by statute to the legal profession, and it is open to them in some other states. The state librarian of Michigan is now (1876) a woman, and in New York one was recently appointed commissioner of the state charities. Women were first appointed to clerkships in the public departments at Washington under President Lincoln; hundreds have since been employed there, and are found to be especially expert and accurate in handling money in the treasury. At several universities they are admitted as students and receive academical degrees. Elizabeth Blackwell was in 1849 the first to receive the degree of M. D., conferred upon her by the medical school at Geneva, N. Y. In 1854 she and her sister Emily opened the New York infirmary for women and children, greatly assisted by Mary Elizabeth Zakrzewska, the originator of the scheme; the latter graduated at the medical school of Cleveland, and in 1863 founded a great institution at Boston, serving under her direction both as a hospital and a school. Antoinette L. Brown (Blackwell) was among the first to be ordained as a minister of religion, at Henrietta, N. Y.; and many other women have chosen the clerical, medical, and legal professions, or excelled as lecturers.—The American machinery of conventions for the promotion of reforms does not prevail in England; but owing to the larger preponderance of women employed there in hard labor and under adverse circumstances as governesses and in other callings, the movement is gaining ground in London and other cities. Mary Wollstonecraft, wife of William Godwin, was among the pioneers. Her "Vindication of the Rights of Women" (London, 1791) led Frances Wright to disseminate the same views in the United States. John Stuart Mill and his wife gave a powerful impulse to the cause in both hemispheres. On May 2, 1867, he moved an amendment to the reform bill in favor of female suffrage, on the ground that the constitution made taxation and representation coexistent, and that it had been granted in counties and boroughs in previous eras. The amendment was rejected by 196 votes; but 76 favored it, including Sir G. Bowyer and Prof. Fawcett. In 1869 Russell Gurney, the recorder of London, put forward a bill, originally proposed by Mr. Locke King, for protecting the 800,000 wage-earning and other married women in their property. In 1870 it was adopted, but so much modified in the house of lords that women still remain incompetent to use, bequeath, or hold their own money. The elementary education act of 1870 made women eligible to school boards; and at the first election, toward the close of that year, Dr. Elizabeth Anderson-Garrett, a well known advocate of woman's rights, received in Marylebone over 45,000 votes, being 20,000 more than any other candidate in any metropolitan ward. Emily Davis was returned at the same time, and in Manchester Lydia Baker. Dr. Garrett and her sister, Mary Carpenter, Mrs. Fawcett, and Frances Power Cobbe are among the more prominent advocates, as well as Mrs. Frank Hill, wife of the editor of the London "Daily News," which favors the movement. Harriet Martineau, Florence Nightingale, Emily Faithfull, and other distinguished persons of both sexes, contribute in various degrees to give moral force to the English movement; but the death of Mr. Mill in 1873 deprived it of its most influential champion. The granting of the elective franchise to women continues to be urged in parliament. In 1870 Jacob Bright, brother of John Bright, brought forward a bill in its favor, which passed to a second reading May 4 by a majority of 124 to 91 votes. It was opposed by the government and thrown out, May 12. His motion was again rejected by 220 to 157 votes, May 3, 1871; by 222 to 143, May 1, 1872, Mr. Disraeli giving a silent vote with the minority; and by 222 to 155, April 30, 1873. The motion is made annually, and with about the same results. In 1876 it was brought forward by Mr. Forsyth, and strongly opposed by John Bright, on the ground that the franchise would be detrimental to the interests of the women themselves, and that the principle is untenable and inconsistent with universal experience; and though supported by his brother, by Fawcett, and other liberals, it was rejected on April 26 by 239 against 152. Women are now employed in various public offices in England, but most extensively in the postal service.—French women evince little or no interest in this question. Even during the period when society had been revolutionized by innovators like Rousseau, an attempt made by Rosa Lacombe (1792) to enlist in its favor the council of Paris proved altogether abortive. Nor have the views of Fourier, Saint-Simon, Michelet, Auguste Comte, Mme. Dudevant (George Sand), Laboulaye, and Legouvé produced any impression beyond the realms of thought. Jenny d'Héricourt's *La femme affranchie* (1860), Léon Richer's *Le droit des femmes*, a periodical (1868-'70), and Olympe Audouard's and André Léo's (Léonie Champseix's) lectures fell dead. On the other hand, there are more women engaged in mercantile life and in government tobacco shops and similar occupations in France than in any other country. Public opinion is favorable to their employment in every occupation excepting in the special spheres of men. In Germany many thoughtful works have appeared in the last and the present century, advocating a wider scope for female activity. The revolution of 1848 produced organs and associations in Leipsic and Berlin. In 1865 the first public meeting was held in the former city. Saxony abrogated in 1866 the laws excluding women from postal, telegraph, and kindred offices. In 1865 Lette founded in Berlin the association still known under his name, for promoting the industrial progress of women; since his death (Dec. 3, 1868) it has been directed by Prof. Holtzendorff, and it became the model of numerous similar organizations in the German and Austrian empires. Among the most active advocates at the present day is Jenny Hirsch at Berlin. Fanny Lewald joined her in 1869 in editing *Die Frauenwelt*, and in 1870 she established another journal, *Der Frauenanwalt*. Conspicuous among novelists interested in the movement was Luise Mühlbach, who died in 1873. In Switzerland, the university of Zürich has many Russian and American female medical students, to whom it awards degrees; and Mrs. Mary Goegg has founded at Geneva an international women's association. In Italy, where not a few women excel in science and literature, there are several organs specially devoted to their interests, and prominent writers like Dora d'Istria favor the cause. But the traditions and institutions of Europe militate against the movement, especially among the Latin races.—See "Woman in the Nineteenth Century," by Margaret Fuller Ossoli (New York, 1845; edited by A. B. Fuller, 1855); "History of the Condition of Women in all Ages and Nations," by Lydia Maria Child (2 vols., New York, 1845; 5th ed., 1854); "Woman in America," by Maria J. McIntosh (New York, 1850); "Woman and her Needs," by Mrs. Elizabeth Oakes Smith (New York, 1851); *Die Frauen und ihr Beruf*, by Luisa Büchner (Frankfort, 1855; 3d ed., 1860; translated into English, Russian, and Dutch); "Woman's Rights under the Law," by Mrs. C. H. Dall (Boston, 1862); "The Employment of Women: a Cyclopædia of Woman's Work," by Virginia Penny (Boston, 1863); "Woman and her Era," by Mrs. E. W. Farnham (2 vols., New York, 1864); *Des femmes par une femme*, by Dora d'Istria (Paris and Brussels, 1864; translated into English, Russian, and Italian); "The College, the Market, and the Court; or Woman's Relation to Education, Labor, and Law," by Mrs. C. H. Dall (Boston, 1867); "Woman's Rights," by the Rev. John Todd (New York, 1868); "The Subjection of Women," by J. S. Mill (London, 1869); and "The Rights of Women: a Comparison of the relative legal Status of the Sexes in the chief Countries of Western Civilization" (London, 1875).

WOMBAT (*phascolomys wombat*, Per. and Les.), a herbivorous marsupial mammal, inhabiting New South Wales, South Australia, Tasmania, and the small islands in Bass straits. The generic name means pouched rat; it is also called badger by the colonists from its burrowing habits, and ursine opossum from its resemblance to a small bear. In the teeth and gnawing propensities it greatly resembles a rodent animal, the incisors being two in each jaw, long and chisel-like; canines wanting, leaving a considerable gap between the incisors and molars; the latter are rootless, with flat crowns surrounded by enamel, there being a deep furrow down the inside of the upper and outside of the lower ones; the whole number of teeth is 24; the body of the atlas remains permanently cartilaginous, the ribs are 15 or 16 pairs, the humerus has an opening between the condyles and the inner one perforated, and the patella is absent; there is a short cæcum and vermiform appendage. It is 2 or 3 ft. long, plump, with a thick coat of long, grayish brown, woolly hair; head large, wide, flat, and rabbit-like, with upper lip cleft, and small eyes and ears; legs short and nearly equal, and the feet five-toed, all except the small inner one of the hind feet with long claws; tail half an inch, nearly naked. The animal walks on the soles, which are broad and naked. It is nocturnal and slow-moving, living in holes among the rocks or in burrows dug by itself; the food consists of grass and roots; it is easily domesticated, and has three or four young at a birth. In the mountainous districts near Port Jackson its flesh is preferred to that of all other animals of Australia. Remains of a fossil species have been found in the caves at Wellington valley, Australia.



Wombat (Phascolomys wombat).

WOOD (A. S. *wudu*), the substance forming the body of the trunk and branches of a tree. The stems of flowering plants are made up of cells of two kinds; the soft parts consist of thin and but little elongated cells, which together form cellular tissue, and running through these are elongated tough and fibre-like cells forming woody tissue. In stems of only one season's duration, the proportion of woody tissue is small, and these are called herbaceous, and the plants herbs. In stems which last from year to year the woody tissue largely preponderates over the cellular, and such stems furnish the substance known as wood. The characters of cellular and woody tissue are given under PLANT, and in that article will also be found an account of the manner of the growth and annual increase of stems, and matters relating to their structure which have a direct relation to their value and utility as wood. The stems of endogens, while they are often of great utility in the countries producing them (see PALM), form no appreciable portion of the wood of commerce, and are but little used in temperate climates. Small quantities of Palmyra, porcupine, and speckled woods, from the stems of the cocoanut and other palms, are employed by the makers of ornamental cabinet work, usually in the form of veneers. The great class of exogenous plants furnishes most of the material known as wood; in these the woody tissue is arranged in a circle around a central pith, and the stem increases in diameter by the formation of an annual layer upon the outside of the old wood; the character of these annual layers, and the manner in which the woody tissue is interpenetrated by plates of cellular tissue, the medullary rays, greatly affect the physical properties of the wood. In chemical composition the different kinds of wood vary greatly; the basis of the wood cells is the same as that of those forming cellular tissue, the principle cellulose ($C_{12}H_{20}O_{10}$), identical in composition with starch, dextrine, and other principles, and but little different from the sugars. But the cells soon become thickened by the deposit upon their interior of a substance which renders them harder and thicker; this incrusting material was formerly regarded as a distinct principle, to which the name lignine was given, but it is now regarded as a mixture of different substances, which on account of the difficulty of separating them from one another, and from cellulose, have not been analyzed; these, according to their solubility in or relations to chemical reagents, have received the names lignose, lignone, lignine, and lignireose. Besides these, under the collective name of lignine, various resins, coloring matters, and principles peculiar to particular genera and families of plants, are deposited in the cells, as well as the earthy matters that appear in the ash when wood is burned; some of these deposits constitute the chief value of particular kinds of wood, such as those used in dyeing, or to afford medicinal extracts. In many stems the change produced by the filling up of the cells is very marked, the older wood being much darker and harder; this is called heart wood, and the newer tissues, in which the change has not taken place, are called sap wood. In some cases the heart wood does not become colored, and its cells are but little thickened, as in the white pine, poplar, and tulip tree, technically known as white timber or white woods. The heart wood has ceased to take any part in the vegetative processes, being practically dead, and is of no use to the tree except by mechanically strengthening the trunk; hence it is not rare to find trees in good health from which the centre has been removed by decay.—Trees are usually felled in winter, when vegetation is at rest, though it has been asserted that if they are felled when in full growth, and the bark removed, the drying is more thorough. The wood, at whatever time the tree may be cut, contains a large amount of moisture, which must be removed to fit it for most uses; when the moisture is allowed to pass off spontaneously, the operation is called seasoning. Logs and beams, whether hewn or sawed, are called timber. The term lumber is applied, chiefly in the United States, to beams, or to the material sawed into planks and boards, or made into siding, shingles, laths, &c. The sawing is usually done soon after felling, as the operation of seasoning is thereby much hastened; while a solid stick requires several years to dry, boards will be sufficiently seasoned in a single year; seasoning goes on most rapidly under cover, and boards are piled up with sticks between them to allow of a free circulation of air. A previous immersion in water for several months, by removing some soluble substances from the wood, causes it to dry more rapidly afterward. The loss of moisture is accompanied in most cases by shrinkage, the amount of which varies with the kind of wood; in the redwood of California it is imperceptible, and with this no regard is paid to seasoning, while some oaks shrink as much as half an inch to the foot. For nice work, ordinary seasoning is supplemented by kiln drying, the lumber being exposed in a chamber to currents of air heated to from 100° to 300° F. A patent has been taken for drying lumber on a large scale by means of superheated steam.—The durability of wood, *i. e.*, its power of resisting decay, does not appear to be associated with any other quality, as the most durable woods are found among light and heavy kinds; woods which decay rapidly when exposed to alternate moisture and dryness are often remarkably durable when kept either altogether dry or constantly under water. Larch, a comparatively light wood, and locust, a very heavy one, are almost indestructible under the most unfavorable conditions. Sap wood is generally much less durable than heart wood, even when protected from the weather. (See DRY ROT, and PRESERVATION OF WOOD.) The properties of density or hardness and specific gravity bear a direct relation to one another. One of the lightest known woods is that of *anona palustris* of Brazil, which has a specific gravity of 0·206, somewhat lighter than cork; and perhaps the heaviest is the ironbark of Australia (*eucalyptus resinifera*), of which the specific gravity is 1·426. In the hard and heavy woods, the fibres are very small, the rings of annual growth exceedingly narrow, and the tissues filled with incrusting substances. Flexibility and elasticity are usually associated qualities, and are found in their greatest perfection in straight-grained woods that are free from knots; as in such woods the fibres are not inclined to interlace, they split readily; the ash, used for oars, lancewood, valued for fishing rods, and hickory, so flexible that when split it is woven into baskets, are woods of this kind. Woods not naturally flexible are made so temporarily by steaming them, and are then bent to the desired shape by powerful machines. The most rigid and toughest woods are those in which the fibres interlace and cross one another at an oblique angle; such woods are difficult to split, and when the parts are torn asunder the surfaces are ragged, in consequence of the breaking of the fibres; among native woods the elm has the quality of toughness in a useful degree, and the hop hornbeam and tupelo are still more difficult to split; lignum vitæ is remarkably tough, and cannot be worked by splitting.—The beauty of woods depends to a great extent upon other qualities than color, though that is important. Though an exogenous stem is practically made up of rings of growth one with another, many causes interfere with the regularity of this arrangement, and a longitudinal section, instead of showing a series of straight lines, presents a great diversity of figure and variety of light and shade. Much of the beauty of a wood will depend upon the manner of dividing it; if the sawing is done somewhat obliquely, beauties are developed that are not visible when an exact longitudinal cut is made. Much of the beauty of some woods depends upon the medullary rays, already mentioned as plates of cellular tissue running radially across the woody fibres; if the wood be cut tangentially, only the ends of these rays will be exposed, but by cutting in the direction in which they run, a beautifully varied surface is presented, on which the medullary rays reflect the light in a most pleasing manner. Knots, so often a blemish in lumber for carpentry, are in some woods the cause of great beauty; these knots may be due to that portion of a living branch which is imbedded within the trunk, or to one that in the early life of the tree has perished, and a portion of which remains within the trunk, covered by a more recent growth of wood; either case produces contorted fibres, changes in density, and difference in color, which greatly increase the beauty of the wood. The portion of a trunk where large branches fork, the burs or gnarls produced by some trees, and the base of the trunk where it is joined by the large roots, all present irregularities of fibre, and are turned to account by the workers of ornamental wood. In sugar maple individual trees are occasionally found in which there is a curious contortion of fibre, producing upon the polished surface the appearance of little projections rising from within small cavities; this is known as birdseye maple.—Colors in woods vary from the almost pure white of the holly to the jet black of ebony; they are sometimes of uniform tint, but frequently, as in mahogany and black walnut, there are different shades of the same color; in rosewood, zebra wood, Amboyna wood, and others, two or more colors are contrasted or blended. But few colored woods fade upon exposure to the light, and in most the color is deepened by time, as in mahogany and black walnut; sometimes the effect of age is produced by applying lime water to the wood before varnishing or oiling it. Staining is often resorted to, and expensive colored woods are imitated in a manner to deceive all but experts. The number of woods esteemed for their odor is few, sandal wood and camphor wood being the principal. The ornamental woods, or fancy woods as they are termed in trade, are often very costly, and are used in the form of thin slices or veneer, glued to a base of common wood. (See VENEER.) A few years ago a company undertook the manufacture of wood hangings, to be used as a substitute for paper hangings; the wood was sliced off in a continuous roll, as thin as ordinary wall paper, having been first impregnated with glycerine to prevent it from becoming brittle. —One of the principal uses to which wood of nearly all kinds has hitherto been applied by all nations, and still is in many countries, is that of fuel. (See FUEL.) Different kinds of wood vary greatly in their value as fuel. In America the most valuable fire wood for warming apartments, and that used as a standard for comparison, is shell-bark hickory. Sugar maple and beech, named in the order of their value, though very nearly equal, are also very valuable woods for fuel, forming bright solid coals. Among the special uses for which particular woods are peculiarly adapted, there is none more striking than that of boxwood for engravings, for which no substitute approaching it in all requisites has been found; in the qualities of hardness and evenness of texture, allowing of the cutting of lines so delicate that they can only be seen by a strong magnifier, it has no equal. Elm is preferred to all other woods for wagon hubs. The locust, while it makes the most durable of gate and fence posts, is the most valued wood for making the treenails used in ship building; it is not only used largely in this country, but large quantities are annually exported for the purpose. For oars ash is used almost exclusively; and for gun stocks, walnut. In the articles upon the different trees in this Cyclopædia the special uses to which their wood is adapted are mentioned; and the following list presents the woods in most common use for the purposes named:

Building.—Ship building: cedar, pine (deals), fir, larch, elm, oak, locust, teak. Wet constructions (as piles, foundations, flumes, &c.): elm, alder, beech, oak, plane tree, white cedar, and palmetto for wharves. House carpentry: pine, oak, whitewood, chestnut, ash, spruce, sycamore.

Machinery and millwork.—Frames: ash, beech, birch, pine, elm, mahogany, oak. Rollers, &c.: box, lignum vitæ, mahogany, service tree. Teeth of wheels: crab tree, hornbeam, locust, service tree. Foundery patterns: alder, pine, mahogany.

Furniture.—Common: beech, birch, cedar, cherry, pine, whitewood. Best furniture: Amboyna, black ebony, cherry, mahogany, maple, oak, rosewood, satin wood, sandal wood, chestnut, cedar, tulip wood, walnut, zebra wood, ebony.

The better known woods are classified according to the properties for which they are most valued as follows:

Elasticity.—Ash, hazel, hickory, lancewood, chestnut (small), snake wood, yew.

Elasticity and toughness.—Beech, elm, lignum vitæ, oak, walnut, hornbeam.

Even grain (for carving or engraving).—Pear, pine, box, lime tree.

Durability.—In dry works: cedar, oak, poplar, yellow pine, chestnut. Exposed to weather: larch, locust.

Coloring matters.—Red: Brazil, braziletto, camwood, logwood, Nicaragua, red sanders, sapan wood. Green: green ebony. Yellow: fustic, Zante.

Scent.—Camphor wood, cedar, rosewood, sandal wood, satin wood, sassafras.

For the resistance to strain of different woods, see STRENGTH OF MATERIALS.—See "Timber and Timber Trees," by Thomas Laslett, timber inspector to the admiralty of Great Britain (London, 1875).

WOOD, the name of five counties in the United States. **I.** A N. W. county of West Virginia, separated from Ohio by the Ohio river, and drained by the Little Kanawha; area, about 400 sq. m.; pop. in 1870, 11,046, of whom 713 were colored. The surface is hilly and the soil fertile. Iron ore and bituminous coal are found. It is intersected by the Parkersburg branch of the Baltimore and Ohio railroad. The chief productions in 1870 were 68,190 bushels of wheat, 5,929 of rye, 327,506 of Indian corn, 80,839 of oats, 138,239 of potatoes, 215,576 lbs. of butter, 24,830 of wool, 21,890 of tobacco, and 5,578 tons of hay. There were 2,745 horses, 2,763 milch cows, 3,410 other cattle, 10,419 sheep, and 6,206 swine; 1 manufactory of boots and shoes, 1 of cars, 22 of cooperage, 3 of furniture, 2 of stoves, &c., 8 of rectified coal oil, 1 flour mill, 1 planing mill, and 5 saw mills. Capital, Parkersburg. **II.** A N. E. county of Texas, bounded S. W. by the Sabine river; area, 840 sq. m.; pop. in 1870, 6,894, of whom 1,247 were colored. The surface is undulating or level, and diversified by prairie and woodland, and the soil is very fertile. The chief productions in 1870 were 1,295 bushels of wheat, 201,547 of Indian corn, 33,033 of sweet potatoes, 11,922 lbs. of butter, and 3,919 bales of cotton. There were 2,226 horses, 3,396 milch cows, 8,693 other cattle, 2,576 sheep, 20,155 swine, and 12 saw mills. Capital, Quitman. **III.** A N. W. county of Ohio, bounded N. W. by the Maumee river, and drained by the Portage and its branches; area, 590 sq. m.; pop. in 1870, 24,596. The surface is level, in some places swampy, and the soil is very fertile. A heavy growth of timber covers a large portion of the county. It is intersected by the Lake Shore and Michigan Southern and the Cincinnati, Hamilton, and Dayton railroads. The chief productions in 1870 were 256,545 bushels of wheat, 309,272 of Indian corn, 232,364 of oats, 131,600 of potatoes, 562,808 lbs. of butter, 126,064 of wool, and 28,579 tons of hay. There were 6,982 horses, 7,000 milch cows, 8,448 other cattle, 33,035 sheep, and 15,749 swine; 7 manufactories of carriages and wagons, 5 of wooden ware, 5 flour mills, and 33 saw mills. Capital, Bowling Green. **IV.** A central county of Wisconsin, drained by the Wisconsin and Yellow rivers and their branches;

area, 828 sq. m.; pop. in 1870, 3,912; in 1875, 6,048. The surface is undulating and the soil fertile. The Green Bay and Lake Pepin railroad traverses it. The chief production in 1870 were 8,659 bushels of wheat, 6,948 of rye, 14,536 of Indian corn, 17,430 of oats, 28,468 of potatoes, 46,643 lbs. of butter, and 3,796 tons of hay. There were 291 horses, 594 milch cows, 1,119 other cattle, 440 sheep, and 537 swine; 1 tannery, 1 currying establishment, 1 machine shop, and 17 saw mills. Capital, Grand Rapids. **V.** A S. E. county of Dakota, recently formed and not included in the census of 1870; area, 576 sq. m. It contains several lakes. The surface is rolling.

WOOD, Anthony à, an English antiquary, born in Oxford, Dec. 17, 1632, died Nov. 29, 1695. He was educated at Merton college, Oxford, and about 1655 began to transcribe the monumental inscriptions and arms in the parish churches and college chapels of the city and university, which led to his "History and Antiquities of Oxford," which was sold to the university, translated into Latin, and published in 1674. He is better known by his "Athenæ Oxonienses, an exact History of all the Writers and Bishops who have had their Education in the University of Oxford, from 1500 to 1690, to which are added the Fasti or Annals of the said University" (2 vols. fol., 1691–'2), greatly improved by Dr. Bliss (4 vols. 4to, 1813–'20).

WOOD, John George. See supplement.

WOOD, Mrs. **Henry.** See supplement.

WOOD, Robert, a British archæologist, born at Riverstown, Ireland, in 1716, died near London, Sept. 9, 1771. He was educated at Oxford, visited Italy, made the tour of Asia Minor and Syria in 1750, with an Italian architect named Borra as a draughtsman, and published "The Ruins of Palmyra" (fol., 1753, with 57 plates), and "The Ruins of Balbec" (fol., 1757, with 46 plates). From 1759 to 1765 he was under-secretary of state. His "Essay on the original Genius and Writings of Homer" was published posthumously (4to, 1775).

WOOD, William Maxwell, an American surgeon, born in Baltimore, Md., May 27, 1809. He graduated M. D. at the university of Maryland in 1829, entered the navy as an assistant surgeon, and was promoted to be surgeon in 1838. In 1844–'6 he was fleet surgeon of the Pacific squadron, and during the civil war of the North Atlantic squadron. In 1870 he was appointed chief of the bureau of medicine and surgery of the navy department, and in 1871 promoted to be surgeon general. He was retired in the autumn of 1872. He has published "Wandering Sketches of People and Things in South America, Polynesia, California, and other Places" (Philadelphia, 1849); "A Shoulder to the Wheel of Progress;" and "Fankwei, or the San Jacinto in the Seas of India, China, and Japan" (New York, 1859).

WOODBINE. See Honeysuckle.

WOODBRIDGE, Timothy. See Blind, vol. ii., p. 721.

WOODBURY, a W. county of Iowa, bounded W. by the Missouri and Big Sioux rivers, which separate it from Nebraska and Dakota; area, about 800 sq. m.; pop. in 1870, 6,172. The surface is undulating and the soil generally fertile. It is traversed by the Illinois Central, the Sioux City and Pacific, and the Dakota Southern railroads. The chief productions in 1870 were 99,740 bushels of Indian corn, 40,653 of oats, 25,040 of potatoes, 22,845 lbs. of butter, and 10,433 tons of hay. There were 873 horses, 3,912 cattle, 706 sheep, and 1,378 swine. Capital, Sioux City.

WOODBURY, Levi, an American statesman, born in Francestown, N. H., Dec. 22, 1789, died in Portsmouth, Sept. 7, 1851. He graduated at Dartmouth college in 1809, was admitted to the bar in 1812, and practised in Francestown till 1816, when he was elected clerk of the state senate; and at the close of the same year he was appointed a judge of the state superior court. In 1819 he removed to Portsmouth. In 1823 he was elected governor of the state, and in 1825 became a member and speaker of the state house of representatives. In the latter year he was also elected United States senator, and at the close of his term in 1831 he was appointed by President Jackson secretary of the navy. In 1834 he was transferred to the office of secretary of the treasury, which he held during the remainder of President Jackson's and the whole of President Van Buren's term. In 1841 he was again elected to the United States senate, and in 1845 President Polk appointed him a justice of the United States supreme court, as successor of Justice Story. He was one of the most influential leaders of the democratic party. He published with Judge Richardson of New Hampshire a volume of law reports, and his "Political, Judicial, and Literary Writings" appeared posthumously (3 vols. 8vo, Boston, 1852).

WOODCHUCK, the common name of an American rodent (*arctomys monax*, Gmel.), the generic characters of which have been given under Marmot. It is 15 to 18 in. long, the color varying from blackish to grizzled above, and chestnut red below; the feet are always dark, and the tail blackish, sometimes with grayish rings. The form is thick and clumsy, neck hardly apparent, head broad and flat, legs short and thick, and tail short and bushy; the nose is wide, lips full and fleshy, eyes small, and ears short; feet large, and naked below; hair rather soft, and whiskers long and stout; there are rudimentary cheek pouches; stomach simple, and cæcum large; there are glands just within the rectum, which secrete a slightly offensive substance. It is found from Hudson bay to South Carolina, and west to the neighborhood of the Rocky mountains. From its voracity and burrowing habits it is often called the ground hog; it digs deep holes in the fields, on sides of hills, or under rocks in the woods, in a slanting direction, at first upward to keep out the water, with several compartments, and usually with more than one entrance; it passes the winter in the burrow, in a lethargic state. The food consists of various plants, fruits, and vegetables; they are especially fond of red clover; they frequently make their incursions at midday, posting sentinels; they are very vigilant, and their sense of hearing is remarkably acute; they are very cleanly, and are easily tamed; they have five or six young at a birth; they fight boldly, and are more than a match for a dog of equal size. The flesh is rank, but is sometimes eaten.

Woodchuck (Arctomys monax).

WOODCOCK, a game bird of the snipe family. The American woodcock (*philohela minor*, Gray) is 11 in. long and 17 in. in alar extent; the body is stout, and the head, bill, and eyes very large; the last are placed very far back; the tibiæ are short and feathered to the joint, and the toes cleft to the base; wings short and rounded, with the first three primaries much attenuated, and the fourth and fifth equal and longest; tarsi stout, and nail of hind toe very short; bill 2½ in. long, the upper mandible the longest; tail short. The upper parts are variegated with pale ashy, yellowish rufous of various shades, and black; on the hind head are three transverse black bands, alternating with three others of pale yellowish rufous; a brownish black line from eyes to bill, and one below the eyes; lower parts pale rufous, brightest on the sides. It is found all over eastern North America; it is nocturnal, keeping quiet by day unless disturbed by sportsmen; it frequents fresh-water marshes and the margins of streams, probing the mud and turning over the leaves in search of earth worms and larvæ. The sense of sight is very acute; from the rapidity and irregularity of its flight it is difficult for an inexperienced marksman to kill it; it is a great favorite with epicures, and is generally served with the entrails in. They pair in spring, making a nest of dried leaves and grasses, in the woods, at the foot of a bush or fallen tree; the eggs are four or five, 1¾ by 1⅛ in., dull yellowish clay-colored, with numerous patches of purplish brown; the young run as soon as hatched.—The European woodcock (*scolopax rusticola*, Linn.), *la bécasse* of the French, found all over Europe, in N. Asia, and in Japan, is about 14 in. long, with long wings, the first primary being the longest; the plumage is like that of the American, being variously mottled with yellowish and ruddy brownish black and gray; the head is grayish in front, yellowish brown with transverse darker brown streaks behind. It is found in dry and high ground in summer, and in the woods and swamps in autumn.

American Woodcock (Philohela minor).

WOOD DUCK, or **Summer Duck** (*aix sponsa*, Boie), an American duck, with the bill very high at the base, shorter than the head, the upper lateral angle running back much behind the lower edge; nostrils very large, the feathers of the forehead reaching to their posterior edge; nail very large and much hooked, occupying the entire tip; head crested; tail about half the length of the wings, wedge-shaped, truncated at the tip, the coverts nearly as long

Wood Duck (Aix sponsa).

as the feathers. The principal characters of the plumage are: head and crest metallic green, glossed on the sides with purple; line from upper corner of bill, one behind eyes, two bars on side of head meeting under the chin, and upper throat white; lower neck and sides of tail purple, the former with triangular spots of white; lower parts white; sides yellowish banded with black and posteriorly with white; speculum bluish green, tipped with white; primaries silver white externally at tip; back uniform, with bronzed and green reflections; a white crescent in front of wings bordered with black; scapulars and inner tertials velvet black with violet gloss; in the female the back is more purplish, the sides of head and neck ashy, about the bill white, and lower neck brownish; the eyes are red. It is 19 in. long, and 29½ in. in alar extent. It is distributed over North America as far as the British provinces, confined to fresh water, especially secluded ponds in woods; the flight is noiseless, very rapid, graceful, and as easy among the branches of trees as that of the wild pigeon; flocks of 50 are often seen. It breeds from April to June, according to latitude, the nest being made in the hollow or broken portion of a tree, and usually in deep swamps; the eggs are 6 to 15, 2 by 1½ in., pale buff and greenish, smooth, and laid on dried plants and feathers; they are much attached to their breeding places, and the young run and swim as soon as hatched, feeding on aquatic insects, flies, and seeds; the adults are excellent divers, and feed on acorns, nuts, grapes, berries, rice, insects, snails, tadpoles, and small fry; the flesh is best in autumn. The sense of hearing is very acute, rendering the bird rather shy. The chief enemies of the adults are minks, raccoons, and snakes, and many of the young are destroyed by snapping turtles, alligators, and predaceous fishes.—The only other species is the famous mandarin duck of China (*A. galericulata*, Boie), which resembles the former, especially the females, with some of the quills enlarged and standing vertically when the wings are closed.

WOOD ENGRAVING. See ENGRAVING.

WOODFALL, William, an English journalist, born in London about 1745, died there, Aug. 1, 1803. He was the younger brother of Henry Sampson Woodfall, by whom the "Public Advertiser" newspaper was conducted when the letters of Junius were published in it. He was bred a printer, became an actor for a short time, and was then editor in succession of the "London Packet," the "Morning Chronicle," and the "Diary," which last journal he established in 1789. In this paper he published daily long reports of the parliamentary proceedings of the previous day. He himself sometimes wrote these reports from memory, and without aid from notes or from an amanuensis, to the extent of 16 columns of the paper.

WOODFORD. I. A N. central county of Kentucky, bounded W. by the Kentucky river and N. E. by a branch of the South Elkhorn; area, 185 sq. m.; pop. in 1870, 8,240, of whom 3,825 were colored. The surface is diversified and the soil very fertile. It is traversed by the Louisville, Cincinnati, and Lexington railroad. The chief productions in 1870 were 98,968 bushels of wheat, 25,942 of rye, 516,625 of Indian corn, 79,888 of oats, 49,556 of barley, 21,503 lbs. of wool, 69,700 of butter, 1,325 tons of hay, and 849 of hemp. There were 3,070 horses, 1,413 mules and asses, 1,903 milch cows, 3,072 other cattle, 4,417 sheep, and 9,535 swine; 2 manufactories of bags, 1 of carriages and wagons, 2 of cooperage, 3 flour mills, and 8 distilleries. Capital, Versailles. **II.** A N. central county of Illinois, bounded W. by Illinois river; area, about 500 sq. m.; pop. in 1870, 18,956. The surface is generally level and the soil fertile. Coal is abundant. There is railroad communication with Chicago. The chief productions in 1870 were 286,446 bushels of wheat, 20,426 of rye, 2,154,185 of Indian corn, 744,581 of oats, 57,776 of barley, 87,994 of potatoes, 305,326 of butter, and 30,701 tons of hay. There were 9,002 horses, 6,300 milch cows, 10,805 other cattle, 1,331 sheep, and 43,642 swine; 10 manufactories of carriages and wagons, 9 of saddlery and harness, and 8 flour mills. Capital, Metamora.

WOODHOUSELEE, Lord. See TYTLER, ALEXANDER FRASER.

WOOD IBIS (*tantalus loculator*, Linn.), a bird belonging, together with the white and glossy ibis (see IBIS), to the family *tantalidæ*, one of the *grallatores*. The genus *tantalus* has the very long bill much thickened at the base and curved downward at the tip; the nasal groove not continued beyond the nostrils, which are broad, pervious, and not surrounded by membrane; the head and neck entirely bare, the skin of the latter transversely rugose; the tibia more than half bare, and covered as well as the tarsus with hexagonal scales; the toes connected at the base by a membrane, and

Wood Ibis (Tantalus loculator).

the outer lateral toe longer than the inner. The wood ibis is the only representative of the genus in the United States. It is showy and mainly white, the tail and quills of the wings being dark metallic green, and the face and head greenish blue; its total length is about 3½ ft., and the spread of its wings as much as 5 ft.; the bill, of a brownish horn color, and considerably curved toward the tip, is nearly 9 in. long, and at its base, where it rises high in the head, is 2 in. thick. They inhabit the southern states, and breed in immense numbers, making their nests upon the tops of trees in cypress swamps; their breeding places are used for several years, and their deep nests made of small twigs lined neatly with the southern *Tillandsia;* they lay three whitish eggs, nearly 2½ by a little more than 1½ in.; the young are hatched in April. They commonly go singly or in pairs, feeding upon small fish, crawfish, and young alligators.

WOOD MOUSE. See Mouse.

WOODPECKER, the common name of the very numerous scansorial or climbing birds of the family *picidæ*. The bill is long, straight, and wedge-shaped, with flattened and truncated tip, and sides more or less ridged; the toes are two before and two behind, with strong sharp claws, enabling them to run upon the branches of trees with great facility; the cervical vertebrae are 12, and greatly developed, the caudal usually 7, the last one very large and with a strong, ridge-like spinous process; the sternum has two excisions at the posterior margin on each side. The tongue has the horns of the hyoid bone greatly elongated posteriorly, extending around the back and over the top of the head, the anterior ends enveloped in a sheath in which they move freely, being attached in advance of the eyes, usually near the opening of the right nostril; these slender bows are accompanied by slips of muscle by whose contraction they are shortened, thrusting the tongue out far beyond the bill; another pair of muscles, folded around the upper part of the trachea and going forward to the anterior part of the tongue, draw the organ in again; its surface is covered with a glutinous matter secreted by two large glands, whose ducts open near the point of the lower jaw, and furnish a fresh supply every time the tongue is drawn in; the tip is also horny, with several barbed filaments pointing backward to retain insects too large to be captured by the viscid secretion. They are very active, living in woods and forests, continually tapping with the bill the surface of trees to discover soft and rotten places, in which are lurking the insects and the larvæ on which they principally feed, and which they obtain by digging with great energy; their motions on the trees are greatly assisted by the stiff tail, which has the feathers pointed at the end, where they are usually much worn; they eat also fruits and seeds. They are generally solitary, and usually silent, the principal noise they make being produced by striking the bill against the trees; it is a mistake to suppose they injure trees, as their common name of sapsucker indicates; being in search of destructive insects, they do much more good than harm. They roost and nest in holes of trees; the eggs are four to eight, pure white, and deposited upon a few chips at the bottom of the hole. Their colors are generally strongly contrasted, black and white, or green and yellow, with red marks about the head. The family is connected with the cuckoos by the wryneck. (See Wryneck.)—The *picinæ* are the typical group of woodpeckers, and are very generally distributed over the earth, though most abundantly in warm regions. Among the hundreds of species, only a few of the most common American ones can be described here. One of these is the hairy woodpecker (*picus villosus*, Linn.), 8 or 9 in. long and 15 in. in alar extent, black above with white band down the middle of back; larger wing coverts and quills with conspicuous spots of white, and two white stripes on each side of head; lower parts white; in the male there is a scarlet nuchal crest, covering the white; the hyoid bones curve around the right eye to its posterior angle. It is found throughout North America to the eastern base of the Rocky mountains, other species occurring on the western slope; it is lively and fearless, met with at all seasons in orchards, woods, and fields, even in the midst of cities; in winter it visits the farm yards to glean among the leavings of the cattle; like other species, it clings when shot to the branches, even after death; the flight is short and rapid, the notes sharp, and the plumage very soft and full, especially in northern regions; it is found all winter in the woods about Lake Superior. —The ivory-billed woodpecker (*campephilus principalis*, Gray) is about 21 in. long and 30 in. in alar extent; the prevailing color is black, glossed with bluish above and greenish below; stripe on side of neck and at base of bill, under wing coverts, parts of secondaries, and inner primaries, white; the crest in the male scarlet; primaries 10, the first very short; tail feathers 12, exterior very small and concealed; tarsi covered anteriorly with large plates. It is found in the southern states, Mexico, and Brazil, inhabiting the lonely forests and dismal swamps, uttering loud notes, "pait, pait, pait," like the high tones of a clarinet, especially in early morning and while preparing the nest. It begins to prepare its nest early in March, high on a tree, digging a cavity under some protecting branch, from 12 to 30 in. deep and 7 in. wide inside, both sexes working at it; it prefers the tops of the highest trees for its feeding places, though it will eat grapes, persimmons, and berries; it does not attack corn and fruits like some other species; its flight is sweeping and very graceful.—The black woodpecker or log cock (*dryotomus* [*hylatomus*] *pileatus*, Bonap.) is 18 in. long and 29 in. in alar extent, with bill bluish black; general color dull greenish black; a narrow white streak from over eyes to hind head, and a wider one from under eyes along neck; crown, crest, and patch on cheeks scarlet; under wings and chin white, tinged with sulphur yellow; in the female there is no red on the cheeks, and the anterior half of the head is black. This is the largest species in the northern states, and is found throughout North America from the Atlantic to the Pacific.—The three-toed woodpecker (*picoides arcticus*, Baird) is found from the northern states to the arctic regions, and from the Atlantic to the Pacific; species occur in the northern parts of both hemispheres, preferring generally forests of pines and spruces.—The *melanerpinæ* or black woodpeckers are all American, and have the bill slightly curved. The red-headed woodpecker (*melanerpes erythrocephalus*, Swains.) is 9¾ in. long and 17½ in. in alar extent; it is bluish black, with head and neck all round crimson red, margined with a narrow crescent of black on upper breast; lower parts, rump, and broad band across wings, white. It is found over North America from the Atlantic to the Rocky mountains; it is very gay and frolicsome, fond of cherries, strawberries, and other ripe fruits, and young juicy corn, and so destructive to the latter that in many places a price is set upon its head; it also eats insects and larvæ, and sucks the eggs of small birds.—In the *colaptinæ* or American ground woodpeckers, the bill has very slight lateral ridges; they are found very frequently on the ground, obtaining their food among ants' nests and the dung of animals; they also alight on trees, in the hollows of which they nest; fruit and corn form a part of their food. The flicker, yellow-shafted, or pigeon woodpecker (*colaptes auratus*, Swains.) is 12½ in. long and 19½ in. in alar extent; it is also called high-holder. The color above is light olivaceous brown with a slight green tinge, each feather with a crescentic band of black near the end; head and upper neck bluish ash, with black patch on each side of cheek and red crescent on nape; throat pale lilac brown; crescentic patch on breast and rounded spots on belly black; shafts and under surface of wings and tail yellow; below yellowish or brownish white; bill slightly curved; the female has no black cheek patches. It is found in eastern North America to the Rocky mountains.—Of the *gecininæ* or old world ground woodpeckers, the green woodpecker (*gecinus viridis*, Boie) feeds chiefly on ants and bees, and is generally seen on the ground.—The *picumninæ* or piculets are very small birds, having a short bill, sharp at the tip, rounded wings, and a short tail with broad rounded feathers, evidently not used as a means of support; they are found in the warm parts of South America, and in India and its archipelago; they nest in holes of trees, and lay two eggs.—For details on other North American species of woodpeckers, see vol. ix. of the Pacific railroad reports, pp. 79–125 (1858).

Black Woodpecker (Dryotomus pileatus).

Pigeon Woodpecker (Colaptes auratus).

WOOD RAT. See RAT, vol. xiv., p. 212.

WOODRUFF (Ang. Sax. *wude-rofe*), sometimes written woodroof, and by the old writers woodderowffe, a low perennial herb (*asperula odorata*) of the madder family (*rubiaceæ*), native of Europe and Russian Asia, often cultivated in gardens. Its square stems, erect from a slender creeping rootstock, are 6 to 12 in. high; the oblong-lanceolate leaves usually eight in a

Woodruff (Asperula odorata).

whorl; the flowers, in terminal clusters, are white, the tube with a four-parted limb; calyx united with the ovary, which ripens into a small, globular, very hairy fruit. The flowers are fragrant, and the leaves, odorless when fresh, give off when wilted or dry the scent of new-mown hay, which is retained by the dried herbage for several years; it belongs to the same class of odors as that of the sweet vernal grass, melilot, Tonqua bean, and vanilla. The plant spreads by its underground stems, and forms dense mats or clumps, a habit of growth which makes it useful for edging to borders; it likes the shade, and may be used to carpet the ground beneath shrubs. It is much esteemed by the Germans, who call it *Waldmeister* and use it to flavor wine; their favorite *Maiwein*, or *Maitrank*, is made by infusing the leaves in Rhine wine; the Germans in this country often use instead the sweet-scented bedstraw (*galium triflorum*), a related plant of similar appearance, which gives off in drying an odor much like that of woodruff. The plant is readily increased by division, or may be raised from seeds.

WOODRUFF, a N. E. county of Arkansas, bounded W. by White river, and intersected by Cache river and Bayou Deview; area, about 575 sq. m.; pop. in 1870, 6,891, of whom 2,686 were colored. The surface is level or slightly rolling, and the soil is fertile. The chief productions in 1870 were 145,495 bushels of Indian corn, 18,780 lbs. of butter, and 5,880 bales of cotton. There were 661 horses, 569 mules and asses, 4,173 cattle, 735 sheep, and 7,157 swine. Capital, Augusta.

WOOD RUSH. See LUZULA.

WOODS. I. Leonard, an American clergyman, born in Princeton, Mass., June 19, 1774, died in Andover, Aug. 24, 1854. He graduated at Harvard college in 1796, and in 1798 was ordained pastor of the church at Newbury. He was professor of theology in Andover theological seminary from its foundation in 1807 till 1846, and took a prominent part in the establishment of the American tract society, the American education society, the temperance society, the American board of commissioners for foreign missions (of the prudential committee of which he was a member for 25 years), &c. His works include "Letters to Unitarians" (1820); "Lectures on the Inspiration of the Scriptures" (1829); "Memoirs of American Missionaries" (1833); "Lectures on Church Government" (1843); and "Lectures on Swedenborgianism" (1846). He published a collective edition of his works in 5 vols. 8vo (Andover, 1849-'50; 4th ed., 1860). **II. Leonard,** son of the preceding, born in Newbury, Mass., Nov. 24, 1807, died in Boston, Dec. 24, 1878. He graduated at Union college in 1827, was ordained in 1833, and for some time edited the "Literary and Theological Review" in New York. From 1839 to 1866 he was president of Bowdoin college, and in 1867 went to Europe to obtain materials for the documentary history of Maine, under the auspices of the state legislature. He translated Knapp's "Lectures on Christian Theology" (2 vols. 8vo, 1831-'3), and De Maistre's "General Principles of Political Constitutions."

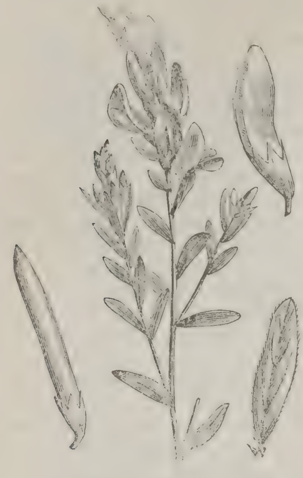
WOODSON, a S. E. county of Kansas, drained by branches of the Neosho and Verdigris rivers; area, 504 sq. m.; pop. in 1870, 3,827; in 1875, 4,476. The surface is level or undulating, and the soil fertile. The Missouri, Kansas, and Texas railroad crosses the N. E. corner. The chief productions in 1870 were 13,312 bushels of wheat, 81,980 of Indian corn, 35,536 of oats, 9,173 of potatoes, 8,293 lbs. of wool, 45,199 of butter, and 4,382 tons of hay. There were 870 horses, 3,638 cattle, 2,214 sheep, and 889 swine. Capital, Defiance.

WOOD SORREL. See OXALIS.

WOODSTOCK, a town and the county seat of Windsor co., Vermont, on the Ottaquechee, an affluent of the Connecticut river, at the terminus of the Woodstock railroad, 45 m. S. of Montpelier; pop. in 1870, 2,910. It has manufactories of scythes, axes, pickers, straw cutters, woollen goods, rakes, children's sleds and carts, &c., a national bank, a savings bank, a high school, three weekly newspapers, and six churches. The legislature met here in 1807.

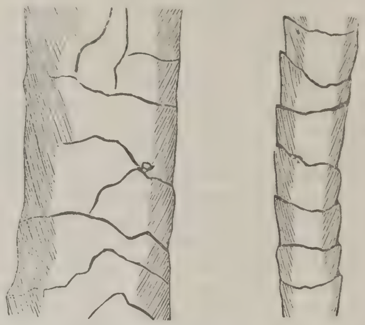
WOODSTOCK. I. A town, port of entry, and the capital of Oxford co., Ontario, Canada, on the river Thames and the Great Western railway, 80 m. S. W. of Toronto; pop. in 1871, 3,982. Its fine scenery attracts many summer visitors. The trade is considerable, and there is good water power. The town contains a woollen factory, six furniture factories, several mills, two branch banks, several good educational institutions, three weekly newspapers, and eight churches. The value of imports for the year ending June 30, 1874, was $114,290; of exports, $194,104. **II.** A town, port of entry, and the capital of Carleton co., New Brunswick, on the St. John river, and on the New Brunswick and Canada and the New Brunswick railways, 61 m. N. W. of Fredericton; pop. in 1871, 3,963. In high stages of water steamers ply to Grand Falls, 65 m. above. Extensive deposits of iron ore are worked in the vicinity. The town contains manufactories of iron castings, mill machinery, agricultural implements, leather, furniture, &c., and several mills. There are a weekly newspaper, a monthly periodical, a grammar school, a convent, and churches of five denominations. The value of imports for the year ending June 30, 1874, was $53,844; of exports, $209,209.

WOODWAXEN, or **Woadwaxen,** the plant *genista tinctoria* (Celtic *gen*, a bush), which is also called dyers' weed, green weed, and whin, the last name properly belonging to *ulex;* it is a low shrub of the *leguminosæ* or pulse family, common in Europe, and naturalized in some of the eastern United States, especially in Massachusetts. The branches, 12 to 18 in. high from a decumbent base, are stiff and green and clothed with simple lanceolate leaves; the yellow flowers, in short racemes at the ends of the branches, are papilionaceous; the stamens all united into a sheath, with the five alternate anthers shorter than the other five; the pod, about an inch long, smooth, flat, and several-seeded. The plant was formerly important as a dye; a decoction of the flowering tops, with alum and cream of tartar as mordants, gives a good yellow color; cloth thus dyed was made green by dipping it in a vat of woad. This is the method by which the once famous Kendal green was produced; the process was introduced by Flemish emigrants, who in the reign of Edward III. settled at Kendal in Westmoreland. This, like woad, has long since been superseded by dyes of foreign origin, though still somewhat employed in domestic dyeing. The plant flourishes in the most sterile places.


Woodwaxen (Genista tinctoria).

WOODWORTH, Samuel, an American author, born in Scituate, Mass., Jan. 13, 1785, died in New York, Dec. 9, 1842. He learned the printer's trade in Boston, worked at it in numerous places, and in 1823 with George P. Morris founded the "New York Mirror." He produced several dramatic pieces, but his reputation rests chiefly upon the song of "The Old Oaken Bucket." His collected poems were published, with a memoir, in 1861 (2 vols. 18mo, New York).

WOOL, a covering similar to hair, growing from the skins of several kinds of animals, but principally of the sheep, the alpaca, and the Cashmere and Rocky mountain goat. In all but the sheep the wool is found only on certain parts of the body; and some parts of the sheep, as the nose and legs, are covered with hair. Other animals, as the beaver and wild cat, have more or less wool concealed beneath the longer growth of hair. Wool is in its structure a modification of hair, and like it is composed of an epithelium and a rind, but is without a marrow. The epithelium consists of small thin plates which overlap each other, giving the surface a scaly appearance, as will be seen in the figures, which represent magnified sections of fibres of Southdown and of Saxon wool. The scaly grooves give to wool its peculiar feeling of rawness and its property of felting. (See Felt.) In all the early races of sheep the distinction between wool and hair is very marked. The hair is coarse and hollow or pithy, and its appearance is much the same, whether on the sheep of the tropics or of cold regions; but in the tropics it is almost free from the under coating of true wool. The structure of wool fits it as perfectly for twisting into a yarn which will not unwind as for felting. The transverse grooves or serrations are exceedingly minute, measuring from each other only $\frac{1}{3000}$ to $\frac{1}{12000}$ of an inch. Wool varies in character according to the particular breed of sheep upon which it grows, and also in some degree to the nature of the soil, food, shelter, and climate. In fine Saxon wool there are about 2,720 imbrications to the inch; in ordinary merino, about 2,400; in the Australian merino, 2,000 to 2,400; in Southdown, about 2,000; and in Leicester, about 1,800. The fibres vary in diameter from $\frac{1}{500}$ to $\frac{1}{1600}$ of an inch. In felting properties Saxon wool is superior to all others, the Leicester and Southdown being inferior, and making only coarse hairy cloth. The finest wool grows on the shoulders and along the back; the next finest on the neck, under the shoulders, and along the ribs. (For the manner of development and growth of wool, see Hair.) A fatty secretion called the "yolk" accompanies the growth of wool, consisting of a soapy matter with a potash base, a small quantity of carbonate of potash, traces of acetate of potash, chloride of potassium, lime, and animal oil, the last imparting a peculiar odor. The yolk may therefore be regarded as a soap with oil in excess. As a rule, the finer wooled sheep have the greatest percentage of yolk, the Saxon often containing from 60 to 75 per cent., while coarse wools contain only from 20 to 50 per cent. The yolk obviously imparts flexibility to the fibres, and as a rule the fineness of fibre corresponds to the fineness of texture of the skin


Sections of Southdown and Saxon Wool, magnified.

it grows on; gross feeding will increase the size of the fibre. Evenness and length of "staple" are desirable, and also "freeness," or that condition in which the fibres are not entangled with each other. Color is important, and for the reception of a brilliant dye it should be quite white. The length of wool ranges usually from 6 to 12 in.; but if the animal is allowed to go long unshorn, the fibres become coarser and may attain a length of 40 in. or more. The usual weight of an alpaca fleece is from 10 to 12 lbs. The whitest wool known in commerce is that of the Angora goat, termed mohair. The fleece, weighing from 2 to 4 lbs. and free from under down, is very silky, hanging in curls of an average length of 5 in. The wool of the Cashmere goat, which is the under coat, is short, but peculiarly soft, rich, and lustrous. The task of separating it, fibre by fibre, from the hair or "hemp" of the outer coat, is very tedious, and, despite the cheapness of Indian labor, is one cause of the great cost of Cashmere shawls.—The rearing of sheep dates from the earliest times; numerous passages in the Bible allude to sheep, wool, and woollen garments. Attic wool was celebrated from a very early period down to the first century B. C. The woollen fabrics of both Greece and Italy were excellent, although Strabo, living at the beginning of our era, says that the fine cloths worn by the Romans in his time were made of wool brought from Spain. Pliny describes several fine-wooled varieties of Spanish sheep. Livingston, classifying the merinoes of Spain at the beginning of the present century, declares those of Castile and Leon to be the longest and to have the finest fleece; those of Soria small, with very fine wool; those of Valencia of fine wool, but with a very short staple. He gives as the average weight of the Spanish fleece 8½ lbs. for the ram and 5 lbs. for the ewe, the loss of weight in washing being one half. The acclimation of the Spanish merino anywhere out of its native country appears to have been first attempted in France by Colbert about 1670; but the first successful importation into France was in 1786, of about 300 sheep, selected by order of the king of Spain in response to the application of Louis XVI. These sheep, from the finest flocks in Spain, were placed on lands at Rambouillet, about 30 m. from Paris. Taken from many different flocks, they gradually blended into one variety, yielding a fleece no finer than the Spanish, but of greater weight, increasing from 6 lbs. 9 oz. in 1796 to 9 lbs. 1 oz. in 1801. The successful introduction of merino sheep into Saxony was somewhat earlier than into France; the stock, in consequence of a different mode of rearing, became physically deteriorated, but improved in fineness of fleece. (For a further account of the qualities of wool produced by different breeds, see SHEEP.)—The English government records show repeated acts or edicts ostensibly forbidding the exportation of wool from the kingdom, but which for some time really prepared the way for profitable licenses of such trade, or for special grants to individuals. In the 13th century a considerable wool traffic with Italy and the Low Countries had grown up. The first act intended to prohibit the exportation of British wool was that of Edward III. in 1337. The purpose of restrictive measures appears to have been to secure control of the trade, with revenue in some instances to the crown, and to encourage woollen manufactures in England. Still in 1354 the export of wool amounted to 31,651 sacks at £6 a sack. Until 1802 the importation of foreign wool into England was free, and the quantity was increasing, the total from 1791 to 1799 being 34,011,369 lbs., of which 33,190,595 was Spanish. At the demand of the wool growers a duty of 5*s.* 3*d.* the cwt. was laid on imported wool in 1802; this was increased until in 1819 it had risen to 56*s.*, nearly 50 per cent. on the average price. Great Britain is the great wool market of the world. The total trade in foreign and colonial wool since 1870 has been as follows:

YEARS.	TOTAL IMPORTS.		Reëxports, lbs.	Retained for consumption, lbs.
	Lbs.	Value.		
1870...	263,250,499	£15,812,598	92.542,384	170,708,115
1871...	323,036,299	17,926,639	135,089,794	187,946,505
1872...	306,379,664	18,523,350	137,511,247	168,868,417
1873...	318,036,779	19,541,678	123,246,172	194,790,607
1874...	344,470,897	21,116,184	144,294,663	200,176,234

The imports in 1875 reached nearly 360,000,000 lbs. More than one half of the entire quantity imported is from Australia; the other most important sources of supply are South Africa, South America, and the East Indies. There is also a considerable export of domestic wool, amounting to 10,077,619 lbs. in 1874, and to 10,649,100 lbs. in 1875. The reëxports of foreign wool are chiefly to the United States, Germany, Belgium, and France. The production of domestic wool has been estimated (clipped) at 164,000,000 lbs. in 1874 and 162,000,000 in 1875. In 1875 there were about 30,000,000 sheep in Great Britain, and about 5,000,000 in Ireland. The production of wool is extensive in Russia, Germany, France, and Spain; it is largely consumed on the continent. Besides those countries in which the production of wool is largely retained for home consumption, the three great sources of supply are Australia, South Africa, and the river Plate in South America. Accurate statistics of the production in these countries are not attainable. The following statement of the production of clothing wool, compiled from the receipts into Europe and the United States by John L. Bowes and brother of Liverpool, will indicate the relative producing capacity of each country and the approximate yield for each year preceding those given in the table. The results are for the amount clipped and the amount of pure wool, after making allowance for shrinkage:

YEARS.	AUSTRALIA.		CAPE OF GOOD HOPE.		RIVER PLATE.		TOTAL.	
	Clipped.	Pure.	Clipped.	Pure.	Clipped.	Pure.	Clipped.	Pure.
1860	60,225,000	35,000,000	26,225,000	14,750,000	40,500,000	15,500,000	127,000,000	65,225,000
1868	155,750,000	90,225,000	39,000,000	25,000,000	199,225,000	75,750,000	394,000,000	191,000,000
1869	160,000,000	92,750,000	41,500,000	26,225.000	206,225,000	78,500,000	407,750,000	197,500,000
1870	180,000,000	104,225,000	43,225,000	29,000,000	181,750,000	69,000,000	405,000,000	202,225,000
1871	185,750,000	107,750,000	48,000,000	30,500,000	195,225,000	74,225,000	429,000,000	212,500,000
1872	181,750,000	105,500,000	55,750,000	34,000,000	210,500,000	78,000,000	448,000,000	217,500,000
1873	190,225,000	109,500,000	47,500,000	32,500,000	232,500,000	83,500,000	470,225,000	225,500,000
1874	222,500,000	124,500,000	49,000,000	34,225,000	207,000,000	72,500,000	478,500,000	231,225,000
1875	244,225,000	136,750,000	49,000,000	35,000,000	201,500,000	70,500,000	494,750,000	242,225,000

—The number of sheep and the production of wool in the United States have been reported by the federal census as follows:

YEARS.	Number of sheep.	Pounds of wool.
1850	21,723,220	52,516,959
1860	22.471.275	60.264.913
1870	28,477,951	100,102,387

The states producing the most in 1870 were: Ohio, 20,539,643 lbs.; California, 11,391,743; New York, 10,599,225; Michigan, 8,726,145; Pennsylvania, 6,561,722; Illinois, 5,739,249; Indiana, 5,029,023; Wisconsin, 4,090,670; Missouri, 3,649,390; Vermont, 3,102,137. The wool clip of Ohio in 1875 was 16,684,276 lbs.; number of sheep, 4,100,288. The total number of sheep in the United States in 1875 was about 34,000,000. The growth of this industry in recent years has been far greater west than east of the Mississippi river. For several years California has produced far more than any other state in the Union, the yield of 1875 exceeding 43,500,000 lbs. The following statement, prepared by James Lynch of New York, a recognized authority, shows the estimated annual production of wool in the United States, in pounds, during the last decade:

YEARS.	Washed—on sheep, tub washed, and pulled.	Unwashed.				Total.
		California, Oregon, and Nevada.	Texas.	New Mexico, Colorado, Utah, &c.	Sundry southern states.	
1866	120,000,000	9,000,000	6,000,000	....	2,000,000	137,000,000
1867	140,000,000	11,000,000	7,000,000	....	2,000,000	160,000,000
1868	150,000,000	16,000,000	8,000,000	....	3,000,000	177,000,000
1869	135,000,000	17,250,000	7,000,000	....	3,000,000	162,250,000
1870	130,000,000	23,000,000	7,000,000	....	3,000,000	163,000,000
1871	110,000,000	25,000,000	8,000,000	....	3,000,000	146,000,000
1872	120,000,000	24,000,000	9,000,000	3,000,000	4,000,000	160,000,000
1873	125,000,000	32,700,000	9,000,000	4.500,000	3.500,000	174,700,000
1874	120,000,000	38,500,000	10,000,000	6,000,000	3,500,000	178,000.000
1875	125,000,000	45,000,000	12,000,000	7,000,000	4,000,000	193,000,000

The quantity and value of wool imported into the United States, for a series of years ending June 30, have been as follows:

YEARS.	Pounds.	Value.
1869	....	$5,600,958
1870	....	6,743,350
1871	68,058,028	9.780,443
1872	122,256,499	27,438,284
1873	85,496,049	20,433,938
1874	42,939,541	8,250,306
1875	54,901,760	11,071,259

The chief countries from which the imports were received in 1875 were: South Africa, 6,286,849 lbs.; Argentine Republic, 8,999,693; Australia, 9,461,644; Brazil, 1,142,750; British possessions in North America, 3,018,547; Chili, 3,616,299; England, 11,882,207; France, 2,515,236; Mexico, 1,095,282; Russia, 3,814,950; Uruguay, 865,440. The quantity from Uruguay was 7,110,911 lbs. in 1872, 6,110,871 lbs. in 1873, and 4,094,275 lbs. in 1874. The imports from Turkey were also much greater in the years prior to 1875, amounting in 1873 to 2,812,840 lbs.

WOOL, Manufactures of. At the time of the Macedonian conquest the natives of India wove shawls of great beauty. The Greeks also learned many processes of woollen manufacture from the Egyptians; and the Romans and also the people of Spain and Byzantium in turn obtained instruction from the Greeks. Woollen garments were generally worn by the Romans of both sexes at a very early period. A fraternity engaged in cloth manufacture appears to have been formed in the 10th century in the Netherlands; the wool of the country was first used, and imports were afterward made, until this district furnished a considerable portion of the cloth demanded in Europe. But Spain already produced her own cloth, and in the 13th century the beauty of cloths made from her fine wools was celebrated. Early in the same century some friars of St. Michael established a woollen manufactory in Florence, and apparently employed processes superior to those previously in use; and this city appears to have had at that time about 300 shops, producing annually about 100,000 pieces of cloth. Accounts 30 years later tell of 200 shops as turning out from 70,000 to 80,000 pieces, worth more than 1,200,000 golden florins. Eventually the manufacturers of wool became most largely established in Flanders, England, and France, the Flemings having especially so far taken precedence in the perfecting of textile processes and products that their workmen became successively the instructors of the less skilled English and French clothiers, and in reality the founders of the improved manufactures now so important to the two last named countries.—Scarlet cloths of England are mentioned in the chronicles of Orkney in the 12th century; and under Henry I. a clothiers' guild was chartered, receiving exclusive privileges within the district of London, Southwark, and the parts adjacent. An inundation occurring in the Netherlands in the time of William the Conqueror, many of the clothiers driven from the country went to England, where they established their business in Carlisle, and then in the western counties. There seems to have been a tendency toward "shoddy" in early times; for Latimer in a sermon condemned the mixing of wares, the stretching of woven pieces to more than their proper length, and the practice of then restoring body in the cloth by incorporating into it a so-called "flock powder," apparently consisting of chopped wool. A project for reforming these abuses, sent to Cecil, mentions them as an enormity endangering the entire commodity of the realm; and in 1590 mention is made of persons appointed in the county of York "to deface, cut in pieces, and burn all such blocks or boards as have been or are used for chopping of flocks." In consequence of invitations extended by Edward III. to Flemish cloth weavers to remove to England, many of them went over; and although for a time they were molested by native workmen, and even their cloths and worsteds were subjected to an export duty discriminating against them and in favor of the latter, yet they were successful. The company of drapers (the word then signifying clothiers or cloth workers), though previously existing, was incorporated in 1364; the cloth shearers or "shearmen" were separately incorporated in 1480, and in 1528 they were united with the fullers by Henry VIII. in the association of cloth workers. The fraternity of tailors received its charter in 1399. Besides these and the weavers, other companies, as those of the dyers, the burrelers or burlers, and worsted workers, were gradually formed. The last named guild, as well as the class of fabrics in which they worked, took its name from the town of Worstead, in Norfolk, where these manufactures were the most important. The early weavers of Norfolk appear also to have been Flemings; and the distribution of the various manufactures not long after the accession of these workmen under Edward III. was as follows: Norfolk, worsteds; Suffolk, baize; Essex and Somersetshire, serges; Devonshire, kerseys; Wales, friezes; Kent, broadcloth; Gloucestershire, Worcestershire, Westmoreland, Yorkshire, Hampshire, Berkshire, and Sussex, cloth. During several subsequent reigns much attention was given to worsteds, and English cloths were still mainly of coarser quality, the finest being imported from Brabant. The exports of English cloths meanwhile became so large that, when in the reign of Henry VIII. the ports of Spain and the Netherlands were closed against them, great distress arose among the manufacturers. At this time Blackwell hall was established as a sort of cloth hall for London dealers, while the foreign trade was chiefly in the hands of the company of "merchant adventurers," who had their mart at Antwerp. The further immigration of Flemish cloth workers in the reign of Elizabeth resulted in a very considerable impulse to the woollen manufactures throughout the kingdom. But during the following reign, and in fact until the close of the 17th century, the contest between the manufacturers and the growers of wool, with the narrow policy of the government, restricting the manufacturers to certain localities or corporations, prohibiting the export of undyed cloths, and dealing in cloths by foreigners, chiefly characterizes the history of the business. In the early part of the 18th century Yorkshire began to assume a more important position in these manufactures, and this county afterward became the chief seat of both the English worsteds and woollens; and though the inventions in connection with spinning machinery for a time gave an unusual prominence to the cotton manufacture, yet the improvement in mechanism and processes for manufactures in wool soon followed, and, aided by the perfection attained by the German wools and the large supplies from other sources, as well as by a more liberal commercial policy, resulted at length in a more healthy condition and growth of these manufactures, which has continued to the present time. The woollen and worsted manufacturing industries in Great Britain in 1871 and 1875 were as follows:

PARTICULARS.	1871.		1875.	
	Wool.	Worsted.	Wool.	Worsted.
Number of factories....	1,949	630	1,925	692
" of spindles	2,664.979	1,821,144	3,266,703	2,182.792
" of power looms	50,830	64,659	58.527	81,747
" of hands	128,946	109,557	138,053	172,097

The value of the total exports of woollen and worsted manufactures for the three years 1873–'5 was as follows:

ARTICLES.	1873.	1874.	1875.
Woollen cloths, coatings, &c..........	£6,599,635	£6,642,222	£6,881,281
Worsted stuffs......	14,277,382	11,888,072	11,163,048
Carpets............	1,597,883	1,480,892	1,160,085
Other articles.......	2,875,478	2,789,666	2,494,434
Total...........	£25,349,878	£32,800,852	£21,648,848

The exports to the United States comprised:

ARTICLES.	1873.	1874.	1875.
Woollen cloths, coatings, &c.	£951,617	£763,708	£761,484
Worsted stuffs	3,763.659	2,800,734	2,276,165
Carpets	806,904	673,336	357,691
Total	£5,522,180	£4,237.778	£3,395,340

—The woollen manufactures of France were of inferior quality and unimportant in amount until the period immediately following the edict of Nantes, 1598, and the further accession of cloth workers from Spain in consequence of the intolerance of Philip III. The first marked impulse, however, was given to the business through the exertions of Colbert, who induced Van Robais of Holland to undertake the manufacture at Abbeville; and to this establishments at Louviers and elsewhere soon succeeded. The progress of the manufacture was still slow and unequal, although these have from the first, with but brief intervals, been sustained by duties on foreign cloths amounting nearly to prohibition. About the middle of the 18th century the woollen manufactures became more firmly established, and the best French cloths are in quality and durability surpassed by those of no other nation, unless it may be the German. The chief centres of manufacture are: for cloths of all sorts, Elbeuf; for fine black cloths and fancy fabrics, Sedan and Louviers; for common cloths, &c., Vienne, Nancy, Orleans, and Carcassonne, besides Metz, which now belongs to Germany; and for worsted and mixed goods, Rheims and Limoges. The total exports of woollen manufactures in 1872 were valued at 290,500,000 francs.—The policy of England toward the American colonies, so long as they remained subject to her control, was directly intended to discourage and repress manufactures of all kinds, those of woollen goods included. The actual result was that the domestic manufacture of coarser or "home-made" cloths became very widely spread and considerable; and the importations of foreign cloths were proportionally small. A society organized within the present state of New York, in 1765, repudiated foreign cloths, and adopted various measures for increasing the home manufacture, even to rules requiring that the flesh of sheep and lambs should not be eaten, nor the animals slaughtered. The supply of wool appears to have been large, and it was mostly worked up and disposed of within the colonies. Many thousands of weavers and cloth workers are said to have come over about the year 1774. The report of Alexander Hamilton on manufactures, in 1791, speaks of a mill for cloths and cassimeres as in operation at Hartford, Conn., but conveys a doubt whether American wool was suitable for fine cloths. The census of 1810, without making it evident that there was within the state at the time a single woollen manufactory, gives for New York the number of looms (largely in private hands) as 33,068, with 413 carding machines, 427 fulling mills, and 26 cotton manufactories. The following is a view of the various products of domestic manufactures for the state according to the same returns:

ARTICLES MADE IN FAMILIES.	Yards.	Value.
Woollen goods	3,257,812	$2,850,585
Cotton "	216,013	69,124
Flaxen "	5,372,645	2,014,741
Tow cloths	21,721	6,510
Mixed and other stuffs	180,659	63,230

The total value of woollen manufactures for the United States in the same year was estimated at $25,608,788. From this time the domestic manufacture seems to have fallen off rapidly, and the succeeding census returns must be taken as indicating mainly the production of factories. The total value of woollen goods returned in 1820 was $4,413,068; in 1830, $14,528,166; in 1840, $20,696,999; in 1850, $43,207,545. Until 1840 a very great proportion of the cloths imported were of English make; since that time the superior dye and finish of French and German cloths have led to their importation to an extent relatively much greater than before. The estimated value of woollen goods (worsteds included) imported into the United States, though fluctuating considerably in the intervening years, was in 1821, $7,437,737; in 1831, $12,627,229; in 1841, $11,001,939; in 1851, $19,507,309; and in 1861, $28,487,166. The latest statistics of the manufactures of wool in the United States are those of the census of 1870. The extent of the industry, including woollen goods, worsted goods, hosiery, and carpets other than rag, was as follows for 1860 and 1870:

PARTICULARS.	1860.	1870.
Establishments, number	1,673	3,456
Hands employed	59,522	119,859
Capital invested	$42.849,932	$132,382,319
Wages paid	$13,361,602	$40,357,235
Wool used, domestic, lbs.	85,634,146	173,389,069
" " foreign, "		46,581,105
Cotton used, lbs.	21,140,403	32,473,680
Shoddy used, "	....	19,574,261
Value of all materials	$46,649,365	$134,154,615
" products	$80,734,606	$217,668,826

The particulars of the different branches are shown in the following statements:

WOOLLEN GOODS.

PARTICULARS.	1860.	1870.
Establishments, number	1,260	2,891
Steam engines, horse power	....	35,900
Water wheels, " "	....	59,332
Machines:		
Cards, sets	3,209	8,366
Daily capacity in carded wool, lbs.	....	857,392
Broad looms, number	....	14,039
Narrow " "	....	20,144
Spindles, "	....	1,845,496
Hands employed	41,360	80,053
Capital invested	$30,862,654	$98,824.581
Wages paid during the year	$9,610,254	$26,877,575

PARTICULARS.	1860.	1870.
MATERIALS.		
Cotton, lbs	15,200,061	17,571,929
Shoddy, "	....	19,372,062
Warp cotton, yds	....	1,312,560
Warp, lbs	....	140,733
Wool, domestic, lbs	70,862,829	154,767,095
" foreign, "		17,311,824
Yarn, cotton, "	....	3,263,949
" woollen, "	....	2,578,419
Chemicals and dye stuffs, value	....	$5,833,346
All other materials	....	$5,670,250
All materials	$36,586,287	$96,432,601
PRODUCTS.		
Blankets, pairs	....	2,000,439
" horse, number	....	58,552
Beavers, yds	....	261,208
Cloth, cassimeres, doeskins, yds	....	63,340,612
" felted, yds	....	1,941,865
Cloths, negro, "	....	1,932,382
Cottonade, yds	....	75,000
Coverlets, number	....	226,744
Flannels, yds	....	58,965,286
Frocking, "	....	75,000
Hosiery, dozens	....	21,460
Jeans, yds	....	24,489,985
Kerseys, yds	....	5,506,902
Linseys, "	....	14,130,274
Repellants, "	....	2,668,767
Carriage robes, number	....	22,500
Rolls, lbs	....	8,683,069
Satinets, yds	....	14,072,559
Shawls, number	....	2,312,761
Skirts, balmoral, yds	....	280,000
Tweeds and twills, &c., yds	....	2,853,458
Warp, lbs	....	122,000
Yarn, "	....	14,156,237
" hosiery, lbs	....	233,000
" shoddy, "	....	1,569,000
Miscellaneous articles, value	....	$3,251,368
All products	$61,894,986	$155,405,358

WORSTED GOODS.

PARTICULARS.	1860.	1870.
Establishments, number	3	102
Steam engines, horse power	....	3,382
Water wheels, " "	....	4,634
Machines:		
Braiders, number	....	7,334
Cards, sets	....	98
Domestic combing machines, number	....	95
Foreign combing machines, number	....	66
Knitting machines, number	....	176
Looms, number	....	6,128
Spindles, "	....	200,617
Hands employed	2,378	12,920
Capital	$3,230,000	$10,085,778
Wages	$543,684	$4,368,857
MATERIALS.		
Chemicals, &c	....	$1,259,016
Cotton, lbs	1,653,000	2,463,808
Shoddy, "	....	12,342
Domestic wool, lbs	3,000,000	13,317,319
Foreign " "		3,836,982
Cotton yarn, "	....	2,146,500
Woollen " "	....	46,240
Worsted " "	....	1,958,880
All materials, value	$2,442,775	$14,308,198
PRODUCTS.		
Braids and lacings, lbs	....	2,324,330
Cloaking, yds	....	5,000
Delaines, "	....	40,804,385
Fancy goods, value	....	$1,974,957
Shawls, number	....	111,404
Shirts and drawers, dozens	....	4,080
Balmoral skirts, yds	....	433,288
Other skirting, "	....	51,851
Webbing and tape, yds	....	2,006,000
Worsted dress goods, yds	....	12,057,006
Woollen yarn, lbs	....	284,100
Worsted " "	....	4,047,750
Zephyr goods, "	....	3,900
All products, value	$3,701,378	$22,090,331

HOSIERY (WOOL AND COTTON).

PARTICULARS.	1860.	1870.
Establishments, number	197	248
Steam engines, horse power	....	2,223
Water wheels, " "	....	4,275
Machines:		
Cards, sets	....	519
Knitting looms	....	438
" machines	....	5,625
Sewing machines	....	1,668
Spindles	....	148,385
Hands employed	9,103	14,788
Capital	$4,035,510	$10,981,260
Wages	$1,661,972	$4,429,085
MATERIALS.		
Cotton, lbs	3,892,342	11,468,508
Cotton yarn, lbs	....	2,188,722
Domestic wool, "	2,927,626	5,304,655
Foreign " "		292,300
Shoddy, "	....	189,857
Woollen yarn, "	....	2,229,777
All other materials, value	....	$1,110,992
All materials	$3,202,317	$9,835,823
PRODUCTS.		
Cotton hose and half hose, doz. prs.	....	1,299,842
Shirts, drawers, and jackets, doz.	....	1,132,189
Gloves and mittens, pairs	....	206,800
Opera boas and scarfs, doz.	....	426,749
Shawls, doz	....	14,947
Stockinet, yds	....	289,372
Woollen and mixed hose, doz. prs.	....	2,970,170
All other products, value	....	$369,784
All products	$7,280,606	$18,411,564

CARPETS, OTHER THAN RAG.

PARTICULARS.	1860.	1870.
Establishments, number	213	215
Steam engines, horse power	....	3,017
Water wheels, " "	....	702
Hands employed	6,681	12,098
Machines:		
Combing machines	....	100
Cards, sets	....	241
Hand looms	....	3,975
Power "	....	1,451
Capital	$4,721,768	$12,540,750
Wages	$1,545,692	$4,681,718
MATERIALS.		
Cotton, lbs	395,000	974,440
Cotton and linen yarns, lbs	....	1,140,737
Jute or flax, lbs	800,000	8,691,909
Wool, lbs	8,843,691	25,189,999
Woollen yarn, lbs	....	7,835,954
All other materials, value	....	$1,577,032
All materials	$4,417,986	$13,577,993
PRODUCTS.		
Brussels, yds	....	806,505
Felt, yds	....	586,000
Ingrain, 2 and 3 ply, yds	....	16,924,711
Jute, yds	....	500,000
Tapestry, yds	....	1,711,000
Velvet, "	....	107,000
Venetian, "	....	1,350,017
All other products, value	....	$670,047
All products	$7,857,636	$21,761,578

The chief centres of the woollen industry in the United States are in New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, and Pennsylvania. In 1870 Massachusetts ranked first in woollen goods, New York in hosiery, and Pennsylvania in capital in worsted goods, and in products in carpets. In the opinion of Mr. George William Bond of Boston and other authorities, this industry reached its maximum in 1872, since which time there has been a marked decline. In 1876 a large proportion of the mills and machinery were idle. The value of the imports of woollen manufactures into the United States during the years ending June 30, 1874 and 1875, has been as follows:

KINDS.	1874.	1875.
Cloths and cassimeres	$13,016,671	$13,680,288
Woollen rags, shoddy, mungo, waste, and flocks	151,156	149.109
Shawls	2,181,887	2,143,498
Blankets	13,472	12,604
Carpets	3,649,863	2,643,932
Dress goods	21,162,635	19,759.488
Hosiery, skirts, and drawers	505,109	683.761
Other manufactures	6,202,395	5,537,024
Total	$46,883,188	$44,609,704

—*Processes of Woollen Manufacture.* If a piece of superfine broadcloth, as requiring in succession all the operations upon the wool, yarn, and fabric needful for woollens of any sort, be taken as the representative of the whole class, the following are the processes through which the materials are passed: 1, sorting the wool; 2, scouring; 3, washing; 4, drying; 5, dyeing (when dyed in the wool); 6, willying; 7, picking or teasing; 8, moating; 9, oiling; 10, scribbling; 11, plucking; 12, carding; 13, slubbing; 14, spinning; 15, reeling; 16, warping; 17, beaming; 18, singeing, sizing, and other preparation of the threads for—19, weaving; 20, scouring; 21, dyeing (when dyed in the piece); 22, drying or tentering; 23, burling; 24, milling or fulling; 25, scouring; 26, drying, or tentering, again; 27, raising, dressing, or teasling; 28, shearing; 29, boiling; 30, brushing; 31, picking; 32, drawing and marking; 33, pressing; 34, steaming; 35, folding or packing. The shearing and pressing are sometimes repeated, the processes of picking, drawing, and marking then coming between them on this second application. Of these processes, more than one half of which are now effected by machinery, some have already been considered in separate articles. (See Cards, Dyeing, Fulling, Teasel, and Weaving.) Of the remaining processes, some are too simple to require particular description, and the others are too technical to be well understood except by actual observation of the processes themselves. The sorting of the wool, as determining the different qualities that shall be mixed for a given quality of cloth, is important. The qualities to be considered in this sorting are chiefly those of fineness, softness, trueness, strength, color, cleanness, and weight, as previously explained. In the English factories, the usual distinctions are into the grades known as "prime, choice, superhead, head, downrights, seconds, fine abb, coarse abb, livery, and breech." In the United States, the grades made by merchants of pulled and clipped or fleece wools, and in the latter of short staple and long staple, or clothing and combing wools, are at the factories again subdivided each into a definite number of sorts, presenting a regular gradation of quality. After sorting, the several packs of wool are separately scoured, washed, and dried. The scouring is effected by soaking the wool in stale urine, or in an alkaline lye heated to 120°; the washing, by placing the wool, after removal from the lye, within wire baskets in running water, or by rinsing in warm suds, and afterward in clean water; and the drying is much facilitated by subjecting the rinsed wool to pressure in passing it between iron rollers. If the cloth is not to be white, it is either wool-dyed or piece-dyed. If the former, the dyeing follows directly on the scouring or washing. Common colors, as browns and olives, are dyed by the larger manufacturers; but the true colors, as blue, black, and green, and those of all cloths of the smaller manufactories, are left to the special dyers. The process of willying or twillying (a term probably derived from winnowing) is analogous to that of batting or scutching in cotton manufacture; the object is to disentangle and open the locks, and free them of sand or other loose impurities. One of the best forms of willy is that in which a hollow truncated cone, with four bars projected beyond but running parallel to its surfaces, and armed with iron spikes, revolves 300 to 400 times per minute within an outer cylinder, armed on the inside with similar spikes. The wool, fed to the smaller end of the cone by an endless apron, travels in revolving by virtue of centrifugal force to the larger; and after being thus opened and beaten up, it escapes into a wire cylinder or receptacle provided with a fan, which blows away the disengaged dust, and finally lays the cleaned wool upon another apron in a continuous sheet. Coarser wools for cloths are willied more than once, sometimes before dyeing, and again after oiling and scribbling. Some larger impurities, such as the willy does not remove, as burs, pitch, or dirt, are then picked out of the wool while spread upon a wire screen, by boys or women; this includes both the picking and moating, the persons engaged being called wool moaters. The wool is then spread upon a floor, sprinkled with olive oil, and well beaten with staves. It is thus prepared for the scribbling machine, the purpose of which is further to open and cleanse the fibres. This process is really a coarser carding, effected by passing the wool successively between several cylinders studded with rows of teeth or wires, and made to revolve rapidly; the wool is conveyed to the cylinders by an apron, and given forth at the last in a delicate sheet, which is wound on a revolving roller. This operation also may be repeated two or three times. From the carding machine, through which the wool is afterward passed, it is delivered in the form of slender cylinders or pipes, called cardings. Slubbing, which is a preparatory spinning, is performed by the slubbing billy, and consists in drawing out and twisting the cardings to the state of a soft, weak thread. This is effected by means of several spindles set nearly upright in a frame, and receiving a turning motion, at the same time that the frame itself is made to recede (upon friction wheels running in rails beneath it) from a roller facing the spindles, and from which roller a carding is fed by the machinery to each spindle at the rate required; the spindles alternately draw out and wind the lengths of thread produced by movement of the carriage, the entire action being quite similar to that of Hargreaves's spinning jenny. (See COTTON MANUFACTURE.) Besides the workman managing the machine, another, or a child, is employed to put fresh cardings in place as they may be required. The proper spinning consists in bringing the soft yarn thus furnished to the fineness and firmness requisite for weaving; and the machinery and operation are again quite similar to those employed in spinning cotton. In view, however, of the variable lengths of the filaments of wool, the two pairs of drawing rollers between which it passes in spinning are so mounted as to be adjustable at different distances, so as neither to allow the soft thread to part between them from its undue length, nor to be broken when too short because of want of space for the fibres to slip one upon the other; while the greater elasticity of wool also allows the velocities of the two pairs of rollers to be so regulated as to produce a greater extension of the thread than in the case of cotton. After the preparation for and the process of weaving follows that of scouring the cloth, in order to remove the oil, sizing, dust, &c., introduced into it purposely or accidentally in the mean time; this is accomplished by beating the cloth with wooden mallets moved by machinery, while it lies in a sort of inclined trough, soap and water being first allowed to flow upon it, and afterward clear water. Piece dyeing and washing may then follow; otherwise, the cloth is next removed to the drying room, or stretched in the open air by means of hooks upon rails or tenter bars, and allowed to dry. Being removed when dry to a suitable room, the operation of burling follows, the burlers picking out of it irregular threads, hairs, and dirt; and the process of fulling then succeeds. (See FULLING.) After the cloth has been fulled one or more times, as may be required, it is again subjected to scouring, fullers' earth being now usually added to the water; and after rinsing, the cloth is again stretched upon the tenters and dried. The cloth in the fulled state has both its surfaces woolly or rough; and that surface which forms the proper face of the cloth, or either one of them if they do not differ, is then subjected to the operations of teasling and shearing. The object of the former process is to raise a sufficient number of fibres upon the surface, and of the latter to cut these to the proper length to form the pile or nap of the finished cloth. To the old plan of fixing the teasels in a hand frame worked over the piece by two men, succeeded some years since that of the gig mill, in which the teasels are set in the periphery of a cylinder; and in the most improved form of this, the teasels are arranged along longitudinal bars in the surface of the large cylinder, with interspaces between the bars, the whole having the appearance of an immense reel. The cylinder revolves rapidly, while the cloth, passing slowly from one roller to another, is brought against one side of it, and receives the action of the teasels. Owing to the readiness with which the points of the burs become soft when wet, and their comparative scarcity and high price, gig mills with what are called metallic teasels, or cards with fine metallic teeth, have been constructed; but though some of these perform satisfactorily, the natural teasels are still preferred. Of these 3,000 are not unfrequently consumed in dressing a single piece of cloth. The shearing of the nap thus raised to a proper and uniform length was, until the beginning of this century, performed by stretching the cloth over a stuffed table, and carefully clipping it with long hand shears; in the first mechanism the only change was in working similar shears by the machinery; but at present several more ingenious modes have been devised. Among the best of these is that invented by Mr. George Oldland of Gloucestershire in 1832. In this, the cloth, being made to move slowly along in a horizontal sheet, is passed directly beneath and in contact with a semicircular cutting edge or "ledger blade," extending across the width of the piece, while directly within this semicircle there is continually turned by a band from the machinery a revolving wheel fitting the curve of the former, and at once carrying and by suitable arrangements of teeth causing to revolve eight small circular cutters about its periphery; as these are thus made successively to play along the ledger blade, they form a sort of endless shears in the highest degree delicate and true. Superfine cloths are dressed and sheared several times in succession, being also once pressed before the last shearing. In the intervals of the preceding operations, or after their completion, the best cloths are now boiled, or "roll-boiled," being wound tightly round a cylinder and immersed for two or three hours in scalding water. The results of this process, patented by Messrs. Daniell and Wilkins of Tiverton in 1824, and improved by Mr. William Hirst of Leeds, are to prevent spotting of the cloth when used, and to impart to it a lustre which was unattainable by any previous process. Other methods, as that of steaming the cloth while stretched or under pressure, though shorter, are said to be less advantageous. Brushing the cloth, which in any case next follows, is effected by passing the piece, while steamed, in contact with revolving cylinders studded with suitable brushes. Picking is then performed, to remove blemishes; and fine-drawing, to close any minute breaks in the fabric; and the usual trade marks, denoting quality, number,

&c., are then worked in at one end of the piece. The brushing is then again performed, and the piece folded is subjected between polished pressing boards to the action of a hydraulic press. A deceptive gloss may be produced in inferior cloths, by hot pressing by means of heating the iron plates; and in any case, with or without a final steaming and drying, the cloth is then folded and packed for sale. Such is a general description of the nature and order of the operations required in converting wool in the fleece into marketable cloths; though some of the less essential of these may not enter into the preparation of all the species of woollen goods, and in particular instances other slight deviations from the usual order besides those already named may occur. It would be impracticable to describe or enumerate the many minor changes or improvements connected especially with the working of the wool previous to carding, with the operation of spinning, and with those to which the cloth is subjected, and of which taken together a great number are every year patented, and many of them introduced into use, not only in this country and in England, but also in countries of continental Europe. We may mention, however, the machine introduced in 1858 by Mr. Archibald of Tillicoultry, Scotland, for piecing the cardings, so as to form them into a continuous length or roving; and that patented by Messrs. Tolson and Irving of England, for imparting to woollen cloths a metallic lustre, in which the yarn or piece is impregnated with a salt of copper, lead, or bismuth, and the metal then disengaged and left upon the fibre by exposure to steam charged with sulphuretted hydrogen. In the United States, in 1858, Mr. Waterman Smith of New Hampshire patented mechanism for keeping the soft woollen thread or sliver of other fibrous materials hot while being drawn, by passing it over or against heated surfaces, the objects being to render the fibres more soft and pliable than otherwise, and to straighten and elongate them in drawing; and Messrs. Kennedy and Plummer of Connecticut, in the same year, obtained a patent for a novel combination of tubes and drawing rollers, and means of working the rollers, by which the processes of drawing and twisting can be performed simultaneously, or either of them separately, and in consequence of which, when the two actions are combined, it is claimed that great convenience is secured, in the way of varying the relative degrees of draught and twist, to suit various lengths and quantities of fibre. Among woollen goods proper are broadcloths and narrow cloths, cassimeres (or kerseymeres), and beaver or double cloth, the last named of which, coarse and warm on one side, and presenting a finely finished surface on the other, was the invention of Daniell and Wilkins, in 1838.—*Processes of Worsted Manufacture.* The object in view in preparing the long wools for manufacture is not to produce that thorough interlacing of fibres which is completed in fulling, but rather to produce a simply spun and woven fabric. The chief preparation of the wool accordingly consists in obtaining the fibres in a straight and parallel condition; and this is effected by combing. The combing wools are themselves subdivided into the long and the short; the former, of lengths varying from 6 to 12 in., are chiefly used for carpets and other coarser goods; the latter, of lengths from 4 to 7 in., for hosiery, merinoes, &c. The principal processes are: 1, sorting; 2, scouring; 3, drying; 4, plucking; 5 (for certain fabrics only), carding; 6, combing; 7, breaking; 8, drawing; 9, roving; 10, spinning; 11, reeling; 12, weaving; 13, dyeing, &c. The wool may be scoured, and mainly dried by passing between rollers; but by the washing machine of Messrs. Petrie and Taylor, both the scouring and drying are more speedily and effectually performed. The wool, in this, is rapidly agitated in hot suds in an iron trough by iron rakes; and being then drawn from the trough by a cylinder with metallic teeth, it is briskly winnowed until dry. Plucking is performed by passing the wool through a machine in which spiked rollers beat up and separate the fibres. The combing of the wool is still performed by hand in some instances, though now more commonly by machinery. In hand combing, the workman uses as required either of two pairs of combs, one having three, the other two rows of long teeth; the rows in either case, from the outermost inward, growing successively shorter. The handle is set into the head of each comb at right angles to the direction of the teeth; and by means of holes, one vertically through the handle, the other entering it at the end, and of corresponding pins projecting from a comb post near the workman, and upon which the handle is to be fixed, the comb can be steadied when required. Near to each workman is also a comb pot, or stove. The teeth of the combs are placed in an opening in the top of the stove long enough to heat them. The workman meanwhile takes about four ounces of wool, sprinkles it with olive oil, and thoroughly rubs this through it with his hands. One of the heated combs, and after it the other, is affixed upon the comb post; among the teeth of each of them in succession the comber jerks or "lashes" one half the wool; and as each is thus charged he returns it, teeth and wool downward, into the heated space in the stove. When the wool is properly warmed, seating himself on a low stool, he holds one comb with the teeth upward by his left hand over his knees, and with the right hand works the other comb, the teeth of which point downward; and he continues this operation, using the teeth of either comb to straighten the wool on the other, and thus working through the wool from the outermost portions until the combs nearly meet. The fibres of the greater part of this quantity of wool are thus properly straightened, and such portion is fitted for spinning into worsted; the small portion remaining on the combs, and called the "noils," is applied to other purposes, being usually mixed with the wool for certain cloths. The wool then undergoes recombing at a lower temperature. The machines for wool combing are very numerous. The first, that of Cartwright (1790), attempted, by means of a circular comb and of a cylindrical working comb and an oscillating frame moving over the former, to imitate closely the process of combing by hand. The machine which first succeeded in displacing this was that of Platt and Collier (1827); in this, two wheels studded about their peripheries with teeth parallel with their axes, forming circular combs, have their disks set crossing at a slight angle with each other, and almost in contact by their near edges. A boy is employed to strike the wool upon the teeth of one comb, and the wheels being at the proper distance, and rotating, the teeth of the empty wheel draw through or comb the wool upon the charged one. When the combing is completed, the "top" or combed worsted is taken off by a boy or girl in a continuous sliver; and by another boy the noils or uncombed part are removed. In improved forms of this machine, the wool having been sufficiently combed, and now equally distributed on both wheels, the rotation of these is discontinued, and the top is disengaged from both of them while turned slowly, by the action of pairs of small rollers between which it is passed. For more detailed accounts of the principal combing machines in use at the time of its publication, see James's "History of the Worsted Manufacture" (London, 1851). Breaking is performed by the breaking frame, the object of which is to open out fibres that may have escaped the combs. In this, the sliver passed between rollers is again acted upon by the teeth of a sort of endless comb, the relative velocities of the two being so regulated that the sliver is extended as well as combed. The smaller roll of sliver thus obtained is wound continuously upon a cylinder, from which it is passed to a second breaking frame with finer teeth. The sliver is afterward subjected to the action of a machine similar to the drawing frame of the cotton manufacture; and it is thus further extended and equalized. The sliver, now greatly reduced, but as yet untwisted, is then brought to the roving machine, in which it is passed successively between two pairs of small rollers, the second pair moving the more rapidly, so as to draw it out in length, while at the same time it is slightly twisted by a turning movement of the hollow bobbin or fly through which the thread is drawn. The spinning is conducted in much the same way as in the case of cotton manufacture; and this and the remaining operations to which the yarn and cloth are subjected do not require especial mention. The worsted yarn is reeled in hanks of 560 yards each; and these are named according to the number of them that make a pound, as No. 24, and so on. The worsted manufactures of England have long been gaining upon those of woollens; among the causes of this change being, that the wool of the country has deteriorated in fineness and felting capacity; that the improvements in machinery have greatly facilitated the combing of the wool, and even of that having a shorter fibre than could formerly be worked in this way; that the fly-spindles in the preparation of the yarn, instead of about 2,800 as formerly, can now be made to perform 6,000 revolutions per minute; that while broadcloths, often 9 ft. in width before fulling, cannot be woven at more than about 50 movements of the shuttle per minute, certain worsted goods are woven at the rate of 160; and that the facility of working cotton into worsted fabrics is very great. It is supposed that 95 per cent. of the worsteds worked in the Bradford district have cotton warps, and that of their total weight at least one third is cotton. Among styles of worsted goods which have been or are now well known are stuffs, merinoes, muslin-de-laines, bombazines, shalloons, says, moreens, camlets, and lastings. (See also CARPET, and STOCKING.)—In connection with the subjects of wool and its manufacture, the reader is referred to "Sheep Husbandry," &c., by Henry S. Randall (New York, 1860), and to "Fine Wool Sheep Husbandry," by the same author (New York, 1863); "The Shepherd's Manual," by Henry Stewart (New York, 1876); and James's "History of the Worsted Manufacture," above mentioned.

WOOL, John Ellis, an American soldier, born in Newburgh, N. Y., in 1789, died in Troy, N. Y., Nov. 10, 1869. He was first a bookseller in Troy, then commenced the study of law, and in 1812 was commissioned captain in the army. He was severely wounded at the storming of Queenstown heights, was promoted to be a major, and for his services in the battle of Plattsburgh was brevetted lieutenant colonel. In 1821 he was made inspector general of the army, and in 1826 brevet brigadier general. In 1832 the government sent him to Europe to examine military systems. In 1836 he took charge of the removal of the Cherokee Indians to Arkansas. In 1841 he was made a full brigadier general. For the Mexican war he collected upward of 12,000 volunteers. He commanded in the early part of the battle of Buena Vista, Feb. 23, 1847, and after Gen. Taylor's return to the United States in November was in command of the army of occupation till the close of the war, returning home in July, 1848. He afterward commanded the eastern military division with headquarters at Troy till October, 1853, the department of the east with headquarters at Baltimore till January, 1854, the department of the Pacific till March, 1857, putting down Indian disturbances in Oregon and Washington in 1856, and again the department of the east with headquarters at Troy. In 1861 he secured Fortress Monroe by timely reënforcement, became commander of the department of Virginia in August, occupied Norfolk May 10, 1862, was commissioned major general May 16, and in June was made commander of the middle department with headquarters at Baltimore. At the close of the war he retired from active service.

WOOLLETT, William, an English engraver, born in Maidstone, Kent, in 1735, died May 23, 1785. He engraved historical subjects and portraits, but was most successful in landscapes. His masterpieces are his "Niobe" and other plates after pictures by Richard Wilson, and the "Death of Wolfe" and the "Battle of La Hogue" after West. He was the first who united in one plate the methods of engraving by aquafortis, the burin, and the dry needle.

WOOLMAN, John, an American Quaker preacher, born in Northampton, Burlington co., N. J., in 1720, died in York, England, in 1773. At the age of 21 he became a speaker in the meetings of the society of Friends. In 1746, in company with Isaac Andrews, he made a tour in the back settlements of Virginia, and from that time continued at intervals to visit the societies of Friends in the different portions of the colonies, supporting himself by working as a tailor. In 1763 he visited the Indians on the Susquehanna, and about 1772 went to England. His published works include "Some Considerations on the Keeping of Negroes" (1753; part ii., 1762); "Considerations on Pure Wisdom and Human Policy, on Labor, on Schools, and on the Right Use of the Lord's outward Gifts" (1768); "Considerations on the True Harmony of Mankind" (1770); and "A Word of Remembrance and Caution to the Rich." "The Journal of the Life and Travels of John Woolman in the Service of the Gospel" (1775) has been many times reprinted (with an introduction by John G. Whittier, Boston, 1871).

WOOLNER, Thomas, an English sculptor, born at Hadleigh, Suffolk, Dec. 17, 1825. He was elected a royal academician in 1874. His principal works are statues of Lord Bacon and Prince Albert, at Oxford; Macaulay, in Trinity college, Cambridge; William III., in Westminster hall; David Sassoon and Sir Bartle Frere, in Bombay; and busts of Tennyson, Carlyle, Darwin, Cobden, Gladstone, Sedgwick, Newman, Fairbairn, Rajah Brooke, Dickens, and Charles Kingsley. Among his imaginative works are statuettes of Ophelia, Elaine, and Guinevere. He is now (1876) engaged upon statues of Dr. Whewell for Cambridge, Lord Lawrence for Calcutta, Sir Cursetjee Jehangeer Readymoney for Bombay, and Lord Palmerston for Palace Yard, and a reredos for the chapel of Looton Hoo, Bedfordshire. He has published "My Beautiful Lady," a poem (London and Cambridge, 1863; 3d ed., 1866).

WOOLSEY, Theodore Dwight, an American scholar, tenth president of Yale college, born in New York, Oct. 31, 1801. He graduated at Yale college in 1820, studied theology at Princeton, and from 1823 to 1825 was a tutor in Yale college. In 1825 he was licensed to preach, and from 1827 to 1830 studied the Greek language and literature in Germany. On his return he was appointed professor of Greek in Yale college, and in 1846 was chosen president of that institution, which office he resigned in 1871. He was ordained at the time of his inauguration. He has edited in Greek "The Alcestis of Euripides" (1833), "The Antigone of Sophocles" (1835), "The Electra of Sophocles" (1837), "The Prometheus of Æschylus" (1837), and "The Gorgias of Plato" (1842); and has published an "Introduction to the Study of International Law" (12mo, Boston, 1860; 4th ed., New York, 1874); "Essay on Divorce and Divorce Legislation" (1869); "Serving our Generation, and God's Guidance in Youth" (1871); and "The Religion of the Present and the Future" (1871). On questions of international law he is regarded as a publicist of weight and authority.

WOOLSTON, Thomas, an English author, born in Northampton in 1669, died in London, Jan. 27, 1733. He was educated at Cambridge, where he became a fellow of Sydney Sussex college and received holy orders. In 1705 he published his "Old Apology for the Truth of the Christian Religion against the Jews and Gentiles revived." In 1727–'30 he published six "Discourses on the Miracles of Christ," the reality of which he denied; and for this he was convicted of blasphemy at Guildhall, and sentenced to a year's imprisonment and a fine of £100. Not being able to pay the fine, he died in confinement.

WOOLWICH, a parish of Kent, England, formerly an independent town, now a suburb of London, on the right bank of the Thames, 9 m. below London bridge; pop. in 1871, 35,557. It stands principally on elevated ground close to the river, with marshes to the east and west. There are several churches and charitable institutions, a town hall, a mechanics' institute, and numerous schools. The greater part of the population is dependent for support upon the government works. The royal dock yard was closed in 1869, after being employed for naval purposes nearly 300 years. The royal arsenal, covering more than 100 acres, is the principal depot of artillery and munitions of war for both the navy and the army. It contains founderies and factories for the manufacture of warlike stores, magazines, a model room with a pattern of every article used in the artillery service, immense quantities of shot and shell, and extensive barracks. A practising ground is attached, nearly 3 m. in range. The government ordnance is all proved at Woolwich. The garrison usually amounts to about 3,500 men. An academy for educating military officers, more particularly for the artillery and engineers, was founded at Woolwich in 1719, and is the principal military school in England. At North Woolwich, on the opposite bank, are many extensive manufactories, especially of telegraph cables.

WOONSOCKET, a town of Providence co., Rhode Island, on both sides of Blackstone river, 16 m. N. N. W. of the city of Providence; pop. in 1870, 11,527; in 1875, 13,576. It borders N. on Massachusetts. Just across the line dividing it from North Smithfield is Woonsocket hill, 580 ft. high, the highest point in Rhode Island, with a pond on its summit. The town has railroad communication by means of the Providence and Worcester and the New York and New England (Woonsocket and Boston division) lines. There are falls in the river. The manufacture of cotton and woollen goods is the principal industry. There are 17 cotton mills with upward of 200,000 spindles, seven woollen mills with 70 sets of cards, and three worsted mills; aggregate capital, from $4,000,000 to $5,000,000. Other establishments are an iron foundery, four machine shops, two manufactories of washing machines, one of rubber goods, and one of musical instruments. There are six national banks, with an aggregate capital of $857,000; five savings banks, with deposits amounting to $4,400,000; graded public schools, including a high school; a free public library (Harris institute), the gift of the late Edward Harris, with 6,000 volumes; two daily, one semi-weekly, and two weekly newspapers, two of which are in French; and eight churches. —Woonsocket was taken from the towns of Cumberland and Smithfield, and was incorporated in 1867.

WOORARA, Woorari, Wourali, Curari, Urari, or **Ticuna,** the name of several powerful poisons prepared by the natives of Pará, Brazil, and the interior of British Guiana, and used by them for tipping the points of weapons employed in war and in hunting. Their real nature and origin are not completely known. One of the most widely accepted accounts of the woorara is that given by Sir R. H. Schomburgk, and asserted by him to be derived from information by the natives as well as observation; this is to the effect that the principal ingredient is the juice of a tree or shrub of the same genus with that yielding nux vomica, for which accordingly he proposes the name *strychnos toxifera.* It seems probable that the different varieties come, at least in part, from several different plants, among which are the *cocculus toxicophorus, strychnos Castelnæana, strychnos cogens, rouhamon Guianensis,* and *rouhamon curare.* Like the poison of venomous serpents, woorara taken into the stomach is, at least in a large proportion of instances, entirely inert and harmless; probably because it is so difficult of absorption by the mucous membranes, that it is removed from the blood by the excretory organs as fast as ingested. Dr. J. W. Green ("American Medical Gazette," vol. vi., p. 299) says that, taken by animals in large quantity and in an empty state of the stomach, it has caused death. The opinion that its chief ingredient is the venom of serpents is directly contradicted by the facts that the poison neither alters the character of the blood, nor excites inflammation in the wound through which it finds its way into the circulation, and also by the absence of any mention of this ingredient in some of the most trustworthy accounts. It is by no means improbable, however, that serpent venom, as well as an exudation from the skin of toads, may be introduced into some varieties. MM. Pelouze and Bernard found it to be absorbed as readily through the membrane of the air cells as when introduced into the areolar tissue. The account of Dr. Hancock, said also to be derived from information by the natives, makes the woorara a watery extract from the bark of a convolvulus or gourd-like plant. Charles Waterton, in his "Wanderings in South America" (London, 1825), enumerates as the sources of the woorara poison a vine having that name, with a very bitter root, two gourd-like plants, two species of venomous ants, pepper, and the fangs of two sorts of poisonous serpents. From these is obtained a mixture having the appearance of a thick brown sirup, with which the arrows to be poisoned are anointed. The flesh of game killed with these arrows may be eaten at once with impunity. If the animal to be killed is large, it is sometimes necessary to use several arrows, which can be done the more easily, as the discharge of the arrows is without noise, and a hunter may successively bring down many birds or small animals with them before he proceeds to gather up his game. They are discharged by blowing from a long slender tube or blow-pipe, called *gravatana.* The arrows are notched, so as to break off in the wound; and by winding a cotton-like material about them they are made to fit the tube, which is of reed, and may be 8 or 12 ft. long. In Peru, arrows only 1½ to 2 in. long are used, and the poison is of a different sort.—The action of woorara has been carefully studied by physiologists, and found to consist in a paralysis of the nerves controlling voluntary motion, and later those presiding over organic life and the heart. The paralysis begins at the periphery, where the finer extremities of the nerves are distributed to the muscular fibres. If the dose is not too large, but yet sufficient to paralyze entirely the voluntary muscles of the thorax and diaphragm, artificial respiration, kept up long enough to allow the poison to be eliminated, will prevent the death of the animal, although of course there will be no motion, with the exception of the pulsations of the heart. It is much used in physiological experiments. The sensitive nerves are affected to a less degree, or, according to the earlier views, not at all. Its uses in practical medicine are extremely limited. It has been suggested as an antidote for strychnia; but although a sufficient dose would prevent the spasm of the respiratory muscles, which is usually the cause of death in poisoning by strychnia, it would do so only by the production of an equally fatal paralysis. This, it is true, might be relieved by artificial respiration, but the experiment would be unnecessarily hazardous in the presence of better means of attaining the same object. Since the action of strychnia is exerted primarily upon the spinal cord, there is no exact antagonism between the two drugs. Similar reasoning applies to its use in tetanus and epilepsy; and as to chorea, it is too powerful to be employed in a disease not usually dangerous. An active crystalline principle, called curarine, soluble in water, alcohol, and ether, and containing no nitrogen, has been isolated, and is active in about one twentieth of the dose of woorara. Among our ordinary drugs, the action of woorara upon the nervous system is most nearly imitated by conium (see HEMLOCK); but conium is readily absorbed from the stomach as well as the subcutaneous tissue.

WOOSTER, a city and the county seat of Wayne co., Ohio, on Killbuck creek, a tributary of the Muskingum river, and on the Pittsburgh, Fort Wayne, and Chicago railroad, 80 m. N. E. of Columbus; pop. in 1850, 2,797; in 1860, 3,361; in 1870, 5,419; in 1876, locally estimated at 7,000. It is finely situated on high ground, in the midst of a rich agricultural district, and is compactly built. It has considerable trade, and manufactories of agricultural machinery, engines, straw board, whips and lashes, furniture, organs, flour, &c. There are two national banks, a high school, four ward schools, two weekly newspapers, and 13 churches. The university of Wooster (Presbyterian) was chartered in 1866 and organized in 1870. It comprises preparatory, collegiate, and medical departments, the last being at Cleveland. The collegiate and preparatory departments have classical, philosophical, and scientific courses, and admit both sexes. In 1875-'6 they had 18 instructors (13 in the college) and 266 students (100 preparatory and 166 collegiate). The library contains about 3,000 volumes. The grounds and building are valued at $150,000.

WOOSTER, David, an American general, born in Stratford, Conn., March 2, 1710, died in Danbury, May 2, 1777. He graduated at Yale college in 1738, and after the outbreak of the war between England and Spain commanded an armed vessel to protect the coast. In 1745 he commanded the sloop of war Connecticut, which conveyed troops in the expedition against Louisburg. As colonel and brigadier general he served through the French and Indian war. In 1775 he was engaged in the expedition to Canada, and after the death of Gen. Montgomery held the chief command. He was afterward commissioned major general of militia, and when Tryon invaded Connecticut to destroy the military stores at Danbury he attacked the rear guard of the enemy, April 27, 1777, and was mortally wounded. In 1854 the state erected a monument over his grave.

WORCESTER. I. A central county of Massachusetts, bounded N. by New Hampshire and S. by Rhode Island and Connecticut, and drained by Blackstone, Chicopee, Nashua, Ware, and other rivers; area, 1,500 sq. m.; pop. in 1870, 192,716; in 1875, 210,242. It is the largest county in the state. The surface is generally undulating, and the soil fertile and under a high state of cultivation. It is traversed by numerous railroads. The chief productions in 1870 were 9,946 bushels of wheat, 20,612 of rye, 284,886 of Indian corn, 173,349 of oats, 47,134 of barley, 639,305 of potatoes, 1,275,897 lbs. of butter, 605,561 of cheese, 16,001 of wool, and 130,185 tons of hay. There were on farms 7,583 horses, 28,514 milch cows, 24,127 other cattle, 4,904 sheep, and 7,900 swine. The whole number of manufactories was 1,863, having an aggregate capital of $33,835,118; value of products, $74,579,759. The most important were 8 of agricultural implements, 13 of boot and shoe findings, 136 of boots and shoes, 14 of bricks, 1 of carpets, 45 of carriages and wagons, 44 of clothing, 14 of combs, 57 of cotton goods, 5 of cutlery, 2 of edge tools and axes, 3 of firearms, 2 of flax and linen goods, 91 of furniture, 32 of hardware, 6 of hats and caps, 2 of hosiery, 21 of iron castings, 90 of machinery, 13 of musical instruments, 10 of paper, 11 of shoddy, 19 of soap and candles, 1 of cast steel, 13 of straw goods, 4 of wire, 7 of wire fabrics, 63 of woollens, 3 of worsted goods, 16 tanneries, 24 currying establishments, 49 flour mills, 11 planing mills, and 95 saw mills. Capitals, Worcester and Fitchburg. **II.** A S. E. county of Maryland, bordering on Delaware and the Atlantic ocean, and bounded W. by the Pokomoke river; area, about 550 sq. m.; pop. in 1870, 16,419, of whom 5,869 were colored. It forms part of the peninsula between Chesapeake and Delaware bays. Along the coast are low sandy beaches, separated from the mainland by an inlet. The Wicomico and Pokomoke and Worcester railroads traverse it. The chief productions in 1870 were 20,674 bushels of wheat, 606,944 of Indian corn, 157,700 of oats, 60,845 of Irish and 44,836 of sweet potatoes, 39,460 lbs. of butter, and 19,924 of wool. There were 2,096 horses, 2,921 milch cows, 6,844 other cattle, 8,094 sheep, and 11,077 swine; 1 manufactory of charcoal, and 12 saw mills. Capital, Snow Hill.

WORCESTER, a city and one of the shire towns of Worcester co., Massachusetts, on the Boston and Albany railroad, 40 m. W. S. W. of Boston; pop. in 1763, 1,478; in 1800, 2,411; in 1820, 2,962; in 1830, 4,173; in 1840, 7,497; in 1850, 17,049; in 1860, 24,960; in 1870, 41,105, of whom 11,946 were foreigners, including 1,963 natives of British America and 8,389 of Ireland; in 1875, 49,265. The city has an area of about 36 sq. m., and is situated partly in a valley and partly on the slopes of the surrounding hills. It is regularly laid out, with wide and pleasant streets. Its principal business thoroughfare, Main street, is a broad straight avenue 2 m. long, shaded with fine trees. Near the centre of the city is a spacious common, containing a soldiers' monument by Randolph Rogers, and a monument to Timothy Bigelow, a revolutionary officer. The houses are generally of brick. Among the public buildings are the two county court houses, adjacent to each other, the county jail, the city hall, the high school building, mechanics' hall, seating 3,000, and the union depot. The Worcester agricultural society has grounds comprising nearly 25 acres, on which are a spacious hall and a trotting park. The city is lighted with gas, and has water works and a good fire department. Besides the Boston and Albany line, there are railroads extending to Fitchburg, to Providence, R. I., to Norwich, Conn., and other points, viz.: the Boston, Barre, and Gardner; Boston, Hartford, and Erie; Providence and Worcester; and Worcester and Nashua. There is a street railroad company. Worcester is noted for the extent and variety of its manufactures. These include boots and shoes, agricultural implements, rolling mill and foundery products, machinery, machinists' tools, stone ware, jewelry, carpets, belting, boilers, machine needles and pegging awls, wire work, firearms, machine screws and cards, cotton thread, yarn, &c., copperas, spindles, spokes, blankets, felt goods, cotton cards, card clothing, drills, files, cement pipe, water meters, horse collars, musical instruments, and nails. The manufacture of boots and shoes is the most extensive branch, employing 28 firms and about 1,500 hands, and producing goods annually of the value of about $2,500,000. There are eight national banks, with an aggregate capital of $2,350,000; four savings banks, with more than $11,000,000 deposits; a safe deposit and trust company, with a capital of $200,000; three fire insurance companies, and one life insurance company. The principal charitable institutions are the city hospital, the home for aged females, and the state lunatic hospital. The last was opened in 1833. The buildings accommodate 300 patients. A new site has been purchased E. of the city, and a building is in course of erection there to accommodate 500 patients. The city has excellent free public schools, including a classical and high school, 22 graded schools, 10 suburban schools, 5 evening schools, and an evening drawing school. Other important institutions of learning are the Worcester academy (Baptist), the Oread institute for young ladies, the Highland military academy, a state normal school, the Worcester county free institute of industrial science, and the college of the Holy Cross. The institute of science was founded by John Boynton of Templeton in 1865, who gave it $100,000 on condition that the city should erect suitable buildings; it has also received $50,000 from the state and $200,000 from Stephen Salisbury of Worcester. Instruction is free to residents of the county. It occupies a fine building on a hill in the N. portion of the city. The institute was opened in 1868, and in 1875–'6 had 12 instructors, 99 students, and 83 graduates. The regular course is three years. A machine shop, costing about $80,000, given by the late Ichabod Washburn, is attached to the institution. The college of the Holy Cross stands on high ground in the S. portion of the city. It was founded by the Rt. Rev. B. J. Fenwick, Roman Catholic bishop of Boston, in 1843, and given by him to the fathers of the society of Jesus, and was incorporated in 1865. The full course comprises seven years, of which three are given to the preparatory and junior classes, and four to the senior (in general corresponding to the four classes of other colleges). In 1874–'5 there were 12 instructors and 177 students; number of volumes in library, 11,000. The American antiquarian society was founded here in 1812 by Isaiah Thomas; it has a library of about 50,000 volumes and a valuable cabinet of antiquities, and its funds amount to $80,000. It occupies a fire-proof building near the court houses. The free public library was founded in 1859; it contains 37,500 volumes, of which 17,000 are for reference and the remainder for circulation. A reading room containing the principal newspapers and periodicals is connected with it. In the same building is the library (4,000 volumes) of the Worcester district medical society. The Worcester county law library association has a library of 3,000 volumes in the South court house. The Worcester county mechanics' association has a

Soldiers' Monument.

reading room and a library of 4,800 volumes, and maintains during the winter a course of lectures and an evening school of mechanical drawing. The Worcester lyceum and natural history society has a fine cabinet, and maintains a course of lectures. The Worcester county horticultural society has a fine hall, and a library of 1,200 volumes, and holds annual exhibitions. Three daily and four weekly (one French) newspapers are published. There are 33 religious societies, viz.: 4 Baptist, 8 Congregational, 1 Disciples of Christ, 2 Episcopal, 1 Friends', 7 Methodist, 5 Roman Catholic, 1 Second Advent, 1 Swedenborgian, 2 Unitarian, and 1 Universalist.—Worcester was permanently settled in 1713, and incorporated as a town in 1722, and as a city in 1848. A settlement, called the "village of Quonsigamog," was begun here in 1675, but was broken up by Indians.

WORCESTER, a city of England, capital of Worcestershire, on the left bank of the Severn, 102 m. W. N. W. of London; pop. in 1871, 33,221. The houses are generally of brick; some of them are two or three centuries old. The cathedral is in the form of a double cross, with a central tower 193 ft. high. In 1872 there were 35 places of public worship, of which 20 belonged to the church of England. Porcelain, iron castings, leather, gloves, hair cloth, and lace are the principal manufactures. Worcester was founded by the ancient Britons, and the Romans afterward made it an important station. It was destroyed by the Danes, and rebuilt about 894, and again burned by Hardicanute in 1041. After the Norman conquest a castle was built upon a height overlooking the river, a part of which still remains. The town suffered much from the incursions of the Welsh; and during the civil war, having espoused the cause of Charles I., it suffered severely from the soldiers of the parliament. On Sept. 3, 1651, the final battle, called by Cromwell "a crowning mercy," was fought here between the royalists under Charles II. and the parliamentarians under Cromwell, in which the former were utterly routed.

WORCESTER, John Tiptoft, earl of, an English statesman, born at Everton, Cambridgeshire, early in the 15th century, beheaded in the tower of London, Oct. 15, 1470. He was educated at Oxford, and in 1449 was appointed lord deputy of Ireland and created earl of Worcester. Under Edward IV. he was made constable of the tower and lord treasurer. He made a pilgrimage to Jerusalem, and on his return presented many valuable manuscripts to the university of Oxford. During the temporary return to power of the Lancastrians in 1470 he was accused of cruelty in Ireland and beheaded. He was a great collector of books. His literary productions comprise translations of Cicero's *De Amicitia* (printed by William Caxton) and of that portion of Cæsar's "Commentaries" which relates to Britain.

WORCESTER, Edward Somerset, second marquis of, an English inventor, born about 1601, died April 3, 1667. With his father, the first marquis, he zealously maintained the royal cause during the civil wars, and Raglan castle, the family seat, was one of the last places that held out against the parliamentary forces. He invented and constructed the first actual steam engine, a description of which is given in his "Century of the Names and Scantlings of such Inventions as at present I can call to mind to have Tried and Perfected" (1663; reprinted in Dircks's "Life, Times, and Scientific Labours of the Second Marquis of Worcester," London, 1865). He described his invention also in "An Exact and True Definition of the most Stupendous Water-Commanding Engine, invented by the Right Honorable (and deservedly to be praised and admired) Edward Somerset, Lord Marquis of Worcester." (See STEAM ENGINE, vol. xv., p. 339.) He was looked upon by his contemporaries as a visionary speculator.

WORCESTER, Joseph Emerson, an American lexicographer, born in Bedford, N. H., Aug. 24, 1784, died in Cambridge, Mass., Oct. 27, 1865. He graduated at Yale college in 1811, and for several years taught in Salem. While here, he prepared the greater part of his "Geographical Dictionary, or Universal Gazetteer" (2 vols., Andover, 1817). His "Gazetteer of the United States" appeared in 1818. He removed to Cambridge in 1819, and in the same year published "Elements of Geography, Ancient and Modern," in 1820 the "Epitome of Geography," in 1823 "Sketches of the Earth and its Inhabitants," and in 1826–'8 "Elements of History, Ancient and Modern," "Epitome of History," and "Outlines of Scripture Geography." In 1827 he published "Johnson's English Dictionary, as improved by Todd and abridged by Chalmers, with Walker's Pronouncing Dictionary combined." In 1828 he was employed to abridge Webster's "American Dictionary," and in 1830 published his own "Comprehensive Pronouncing and Explanatory Dictionary." In 1830–'31 he visited the universities of England and Scotland, and collected philological and lexicographical works. In 1846 appeared his "Universal and Critical Dictionary of the English Language," which was reprinted in London without his consent, with a title page altered so as to read "Webster's Critical and Pronouncing Dictionary, &c., enlarged and revised by Worcester," and with a garbled preface. In 1855 he published a "Pronouncing, Explanatory, and Synonymous Dictionary," and in 1860 his quarto "Dictionary of the English Language," in 1854 pages. He also published a "Pronouncing Spelling Book of the English Language" (1857), and "Remarks on Longevity" (from the "Transactions of the American Academy of Sciences"), and edited the "American Almanac" from 1831 to 1843 inclusive.

WORCESTER. I. Noah, an American clergyman, born in Hollis, N. H., Nov. 25, 1758, died in Brighton, Mass., Oct. 31, 1837. He was a fifer in the army in 1775, and fife major in 1777, serving at the battles of Bunker Hill and Bennington. In 1786 he published a "Letter to Rev. John Murray concerning the Origin of Evil." In 1787 he was ordained pastor of the Congregational church in Thornton, N. H., where he had previously filled several civil offices. In 1802 he was the first missionary of the New Hampshire missionary society, and labored in that capacity again in 1804. From 1810 to 1813 he was in charge of his brother's congregation in Salisbury. In 1810 he published "Bible News, or Sacred Truths relating to the Living God, his only Son, and Holy Spirit" (3d ed., 1825), which the Hopkinton association condemned as unsound on the doctrine of the Trinity. From 1813 to 1818 he edited "The Christian Disciple," a periodical published in Boston. In 1814 he published his celebrated tract entitled "A Solemn Review of the Custom of War, by Philo Pacificus," which was translated into several languages. In 1816 he was one of the founders of the Massachusetts peace society, and in 1819 he commenced "The Friend of Peace," which continued in quarterly numbers for ten years, nearly the whole of it being written by himself. In 1829 he published "The Atoning Sacrifice a Display of Love, not of Wrath;" in 1831, "The Causes and Evils of Contention among Christians;" and in 1833, "Last Thoughts on Important Subjects." The Rev. Henry Ware, jr., published "Memoirs" of him (Boston, 1844). **II. Samuel,** an American clergyman, brother of the preceding, born in Hollis, N. H., Nov. 1, 1770, died at Brainerd, Tenn., June 7, 1821. He graduated at Dartmouth college in 1795, was licensed to preach in 1796, and was pastor of the Congregational church in Fitchburg, Mass., from 1797 to 1802, and of the Tabernacle church, Salem, from 1803 till his death. He became corresponding secretary of the American board of commissioners for foreign missions in 1810, and in 1815 engaged in the Unitarian controversy. He published three orations, six sermons on the doctrine of future punishment (1800), three letters to Dr. Channing in connection with the Unitarian controversy (1815), and Watts's entire and select hymns (1818). A volume of his sermons appeared in 1823. **III. Samuel Melanchthon,** son of the preceding, born in Fitchburg, Mass., Sept. 4, 1801, died in Boston, Aug. 16, 1866. He graduated at Harvard college in 1822, was for several years professor of rhetoric and oratory in Amherst college, and then became pastor of the church in Salem which had been served by his father. He published "Essays on Slavery" (1826); "Life and Labors of Rev. Samuel Worcester" (2 vols. 12mo, Boston, 1852); and "Memorial of the Tabernacle, Salem" (1855).

WORCESTERSHIRE, a W. county of England, bordering on the counties of Salop, Stafford, Warwick, Gloucester, and Hereford; area, 738 sq. m.; pop. in 1871, 338,848. The surface is generally level or undulating, and there are some beautiful vales on the banks of the rivers, the chief of which are the Severn, Avon, Stour, and Teme. The soil is deep and fertile. Celebrated cider is made. Coal, salt, and iron are found. The chief towns are Worcester, the capital, Evesham, Droitwich, Dudley, Kidderminster, and Bewdley. Dudley is the chief seat of the iron manufacture. Kidderminster is famous for its carpets, and Worcester for its porcelain.

WORDE, Wynkin de, a printer, born in Lorraine about the middle of the 15th century, died in London about 1534. He accompanied Caxton to England, and was his assistant till his death about 1491, when he succeeded to his business. He made great improvements in the art, introducing Roman letters, and cutting many new fonts of all sizes and of greatly improved appearance. He also supplied type to other printers, who soon became numerous. He introduced into his "Instructions for Pilgrims to the Holy Land" (London, 1523) Greek type, of which he was the first in England to make use, and also some Arabic and Hebrew words, which were cut on wood blocks. Some of his punches are said to be still in existence. Between 1491 and 1534 he published 408 distinct works, most of them remarkable at that period for neatness and elegance, and many illustrated by wood engravings, said by Jackson ("History of Wood Engraving") to have been executed in England.

WORDEN, John Lorimer, an American naval officer, born at Mount Pleasant, N. Y., March 12, 1818. He entered the navy as midshipman in 1834, and became lieutenant in 1840, commander in 1862, captain in 1863, commodore in 1868, and rear admiral Nov. 20, 1872. In February, 1862, he took command of the ironclad Monitor, with which on March 9 he engaged the confederate ironclad Virginia (formerly Merrimack) in Hampton roads. (See HAMPTON ROADS.) In this action he was nearly blinded by particles of cement driven into his eyes while watching the enemy from an eyehole in the pilot house. He received the thanks of congress, and subsequently recovered his sight, and served with credit through the war. From 1869 to 1874 he was in command of the naval academy at Annapolis, and in 1876 of the European station.

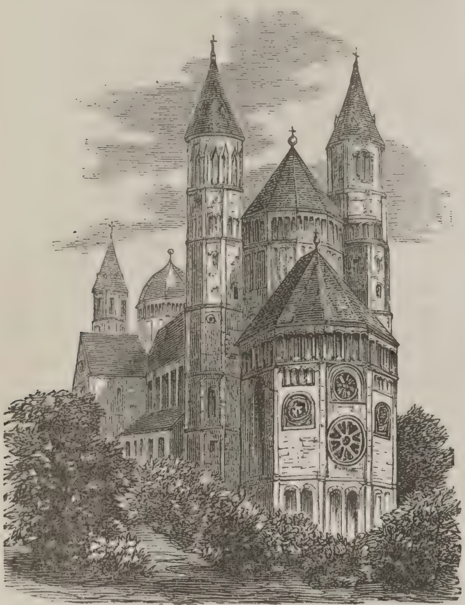
WORDSWORTH. I. William, an English poet, born at Cockermouth, Cumberland, April 7, 1770, died at Rydal Mount, Westmoreland, April 23, 1850. He graduated at Cambridge in 1791, where he mastered Italian and gained an extended acquaintance with the classics and English poets. At this period he says he had a growing belief in his own mission as a poet, and selected Chaucer, Spenser, Shakespeare, and Milton as his models. In 1790 he made a pedestrian tour through France, Switzerland, and the north of Italy, being in France when the revolutionary enthusiasm was at its height. After taking his degree he lodged for four months in London; went on a pedestrian excursion to North Wales; and in the autumn of 1791 began a second tour in France, where he sympathized with the revolution. He remained about a year in Orleans, Blois, and Paris, and returned to England just in time, as he afterward acknowledged, to save him from the guillotine. He settled in London, and published in 1793 two poems in the heroic couplet, "An Evening Walk, addressed to a Young Lady," and "Descriptive Sketches, taken during a Pedestrian Tour among the Alps," which attracted little notice. In his republican zeal, he proposed in an unpublished letter to the bishop of Llandaff to abolish the monarchy and the peerage. He was indignant that England made war against France, and, after witnessing on the Isle of Wight the equipment of the fleets, strayed toward Wales, and began in the Spenserian stanza the poem of "Guilt and Sorrow," which did not appear entire till 1842. In 1795 he received a legacy of £900 from Raisley Calvert, a young friend whom he had attended for several months in his last illness. A further sum of £8,500 was paid to the family in 1802, to be divided among five children, as arrears due from the earl of Lonsdale, and Wordsworth now resolved to make poetry his sole business. In the autumn of 1795 he settled at Racedown in Somersetshire, with his sister Dorothy, his associate during the remainder of his life. There he began the tragedy of "The Borderers," which was published in 1842. In June, 1797, Coleridge visited him, and they became friends for life. Subsequently, to be near Coleridge, the Wordsworths removed to Alfoxden, Somersetshire. In November, 1797, the poets started on a pedestrian tour through the surrounding country, and began a joint composition. Coleridge suggested the theme of "The Ancient Mariner," to which his partner contributed one or two ideas. But they soon discovered that the supernatural was the stronghold of the one, and the natural of the other; and they began to concentrate their powers upon separate poems. Their roving and contemplative habits laid them under suspicion, and the agent of the landlord at Alfoxden refused to let the house to Wordsworth any longer. This determined the two poets and Miss Wordsworth to make a trip to Germany, and to raise the requisite funds the volume entitled "Lyrical Ballads" was offered to Joseph Cottle of Bristol. He offered 30 guineas for Wordsworth's portion; made a separate bargain with Coleridge for "The Ancient Mariner," the first piece in the collection; printed 500 copies (1798); and soon after sold the larger part of the impression at a loss to a London publisher, and presented the copyright, as of no value, to Wordsworth. The volume was an experiment upon the public taste as to how far the humblest subjects and language "really used by men" should be deemed fit for poetry; and it was universally neglected, ridiculed, or condemned. Meantime Wordsworth sailed from Yarmouth, had interviews with Klopstock at Hamburg, remained several months at Goslar, returned to England in the spring of 1799, and soon after took up his residence with his sister at Grasmere, in Westmoreland. In 1800 appeared a second edition of the "Lyrical Ballads," in two volumes, with the addition of many new pieces, and with an exposition in prose of the principles on which as a poet he professed to write. They were reprinted in 1802 and 1805, and became popular with a large class. In 1802 Wordsworth married Miss Mary Hutchinson of Penrith, whom he had known from childhood, and on whom he wrote the lines, "She was a phantom of delight." In 1803, on a tour through Scotland, in company with his sister and Coleridge, he made the acquaintance of Sir Walter Scott and Sir George Beaumont. His sister's journal of this tour, edited by Principal Shairp, was first made public in 1874. In 1807 he published two new volumes of "Poems," the sale of which was almost stopped by the contempt and ridicule of Jeffrey in the "Edinburgh Review." In 1809 Wordsworth published an essay on the convention of Cintra, which he strongly condemned; and from that time he became a conservative. He removed in 1808 to Allan Bank, and in 1813 to Rydal Mount, in sight of Lake Windermere, his residence for the remainder of his life, the grounds and gardens of which were skilfully embellished under his direction. In 1813 also he was appointed distributor of stamps in the county of Westmoreland, an office which afforded him over £500 a year. It had long been his aim to compose a vast philosophical poem, as an introduction to which he completed in 1805 "The Prelude," first published posthumously in 1850, containing a record of the cultivation and progress of his own powers. The main poem, entitled "The Recluse," was to consist of three parts; but only the second part, entitled "The Excursion" (1814), was ever published. In 1815 appeared "The White Doe of Ryestone," a romantic narrative poem, to which he assigned the highest place among his productions; in 1819 the seriocomic tales of "Peter Bell" and "The Wagoner," both of which had been written many years before, and were severely attacked; and in 1822 a collection of sonnets and poems under the title of "Memorials of a Tour on the Continent," soon followed by his series of ecclesiastical sonnets. His whole income from his literary labors had not in 1819 amounted to £140. But his reputation rose rapidly from 1830 to 1840; in 1839 the degree of D. C. L. was conferred on him by the university of Oxford; in 1842 he was permitted to resign his office to his second son, and received a pension of £300; and in 1843 he succeeded Southey as poet laureate. He published a collected edition of his poems in 1842, arranging them in a new order according to subjects. His complete prose works, including "An Apology for the French Revolution," various letters and speeches on education, two essays on epitaphs, and much other heretofore unpublished matter, including several poems, have been edited by the Rev. A. B. Grosart (3 vols. 8vo, London, 1876).—His only daughter, DORA, married in 1841 Edward Quillinan, author of several poetical works, "The Conspirators, a Romance," and a partial translation of Camoëns's "Lusiad." She published "Journal of a few Months' Residence in Portugal, and Glimpses of the South of Spain" (2 vols. 8vo, 1847), and died July 3, 1847. **II. Christopher,** an English clergyman, youngest brother of the preceding, born at Cockermouth, Cumberland, June 9, 1774, died at Buxted, Sussex, Feb. 2, 1846. He graduated at Trinity college, Cambridge, in 1796, and was elected a fellow. His "Six Letters to Granville Sharp, Esq., respecting his Remarks on the Use of the Definite Article in the Greek Text of the New Testament" (1802), procured him the office of chaplain to the archbishop of Canterbury. He received several preferments, was master of Trinity college, Cambridge, from 1820 to 1841, and afterward resided at his rectory of Buxted. He published an "Ecclesiastical Biography" (6 vols. 8vo, 1809); "Sermons on Various Occasions" (1814); "Who wrote Eikon Basilikè?" (1824); "King Charles I. the author of Eikon Basilikè, further proved" (1828); and "Christian Institutes" (4 vols. 8vo, 1837), designed for students in the university and candidates for holy orders. **III. Christopher,** an English prelate, son of the preceding, born in 1807. He graduated at Cambridge in 1830, became a fellow, travelled in Greece in 1832–'3, and published "Athens and Attica" (1836). In 1836 he was appointed public orator of the university of Cambridge and head master of Harrow school, retaining the latter office till 1844, when he was made a canon of Westminster. He became vicar of Stanford-in-the-Vale, Berkshire, in 1850, and bishop of Lincoln in 1869. His works include "Ancient Writings copied from the Walls of the City of Pompeii" (1837); "Greece, Pictorial, Descriptive, and Historical" (1839); "The Correspondence of Richard Bentley" (2 vols., 1842); "Theophilus Anglicanus, or Instruction for the young Student concerning the Church, and our own Branch of it" (1843; 9th ed., 1865; abridged and published under the title of "Elements of Instruction concerning the Church," &c., 1849); "Diary in France, mainly on Topics concerning Education and the Church" (1845); "Letters to M. Gondon on the Destructive Character of the Church of Rome" (1847; with a "Sequel," 1848); "On the Canon of the Scriptures" (1848); "Lectures on the Apocalypse" (1849); "Babylon, or the Question examined, Is the Church of Rome the Babylon of the Apocalypse?" (1850); "Memoirs of William Wordsworth, Poet Laureate" (2 vols., 1851); "St. Hippolytus and the Church of Rome in the earlier part of the Third Century" (1853); "Remarks on M. Bunsen's Work on St. Hippolytus" (1855); "The New Testament in the Original Greek, with Introductions and copious English Notes" (4 parts, 1856–'60); "The Holy Year" (1862); "Journal of a Tour in Italy" (2 vols., 1863); "Union with Rome" (1867); and "The Holy Bible, with Notes and Introductions" (6 vols., 1864–'70); besides an edition of Theocritus (1844), and many volumes of sermons and lectures, of which the most celebrated appeared under the titles "Discourses on Public Education" (1844), "The Interpretation of the Old and New Testament" (1861), and "The Church of Ireland: her History and Claims" (1866). **IV. Charles,** brother of the preceding, born at Bocking, Essex, in 1806. He graduated in 1830 at Oxford, where he became a tutor, and was second master of Winchester college from 1835 to 1845, and first warden of Trinity college, Perthshire, from 1846 to 1854. In 1852 he was chosen bishop of the united sees of St. Andrews, Dunkeld, and Dunblane, Scotland, and in 1853 received from Oxford the degree of D. C. L. He is one of the New Testament company for the revision of the English version of the Bible. He has published *Græcæ Grammaticæ Rudimenta* (London, 1839), which has passed through 16 editions; "Communion in Prayer" (1843); "History of the College of St. Mary, Winton" (1848); "A United Church of England, Scotland, and Ireland Advocated" (1861); "On Shakspeare's Knowledge and Use of the Bible" (1864); and a "Letter to the Right Hon. W. E. Gladstone, on Religious Liberty."

WORKHOUSE. See PAUPERISM, vol. xiii., p. 181.

WORM GRASS. See PINKROOT.

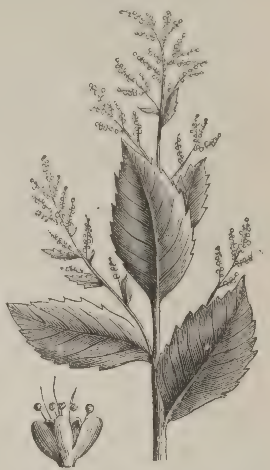
WORMS. See ANNELIDA, EARTHWORM, ENTOZOA, HAIR WORM, LEECH, NEREIDS, PLANARIANS, and RIBBON WORM.

WORMS, a city of the grand duchy of Hesse, Germany, on the left bank of the Rhine, 26 m. S. S. E. of Mentz; pop. in 1871, 14,484, comprising about 9,000 Protestants, 4,000 Catholics, and 1,000 Jews. The streets are exceedingly crooked. Worms has a Byzantine cathedral with four towers, begun in the 8th century and completed in the 12th. Prominent among the other churches is the Gothic Liebfrauenkirche, which gives name to the famous Liebfrauenmilch wine, produced in its vicinity. The synagogue dates from the 11th century. Worms has much trade, and manufactories of polished leather, cigars, and other articles.—It is one of the oldest of German cities, and was the scene of the *Nibelungenlied*, which begins by telling how King Günther in Worms reigned over the Burgundians. (See NIBELUNGENLIED.) The Romans had a station here. Attila destroyed the city, and Clovis rebuilt it. Charlemagne and his successors occasionally resided here. Under the German empire it was successively ruled by local counts and by the dukes of Franconia. It subsequently became a free imperial city, and many diets of the empire were held here. In 1495, under Maximilian, the "eternal peace" was here decreed. Here also took place Luther's memorable declaration before Charles V. and his first diet, April 18, 1521. Under the Hohenstaufen the population reached 60,000, and at the close of the thirty years' war it still numbered 30,000. In 1689 it was burned by the French. An offensive treaty (*Wormser Traktat*) was concluded here Sept. 17, 1743, between England, Maria Theresa as queen of Hungary, and Sardinia. The city suffered much in the early period of the wars of the French revolution. The ancient see of Worms (pop. 20,000) was by the treaty of Lunéville (1801) mostly given to France, and one fourth of it on the right bank of the Rhine to Hesse-Darmstadt, the whole reverting in 1814 to the latter country. The colossal monument of Luther, with the figures of the principal reformers and of the cities of Spire, Magdeburg, and Augsburg, was, after Rietschel's death in 1861, completed by Donndorf and Kietz, and unveiled June 25, 1868.

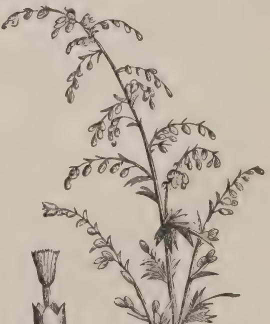


Worms Cathedral.

WORMSEED, the popular and trade name for two drugs used as anthelmintics, of very different origin and composition. **I.** The *chenopodium* of the United States Pharmacopœia, often called American wormseed, is the fruit of *chenopodium ambrosioides*, var. *anthelminticum*, or *C. anthelminticum* of some authors. The structure of the genus is sufficiently described under Pigweed; this belongs to a section in which the species are scentless and neither smooth nor mealy like the common pigweeds, but furnished with abundant glands containing an aromatic oil. Wormseed is a biennial or perennial, introduced from tropical America, and found in waste places, especially southward. It grows 1 to 2 ft. high, and in the southern states 4 to 5 ft.; the stem grooved, much branched above, with alternate, oblong-lanceolate, deeply toothed, and sometimes much cut leaves; the minute apetalous flowers in slender terminal or axillary racemes. The whole plant has a strong, peculiar, and somewhat aromatic odor, due to a volatile oil which is especially abundant in the seeds. As found in the shops, wormseed consists of small yellowish green grains, about the size of a pin's head, the seed being invested by a thin bladdery seed vessel; they have a pungent and bitterish taste. The seeds are used in domestic practice and by physicians to expel the round worms in children, and are regarded as very effective. The dose is 20 to 40 grains, but on account of the difficulty of administering them the oil is most frequently used. The oil, the production of which is peculiar to this country, is mainly prepared in Maryland, where the plant is cultivated for the purpose; it is separated by distillation, and has the properties of the seeds in a concentrated form; the dose for a child is four to eight drops. **II.** The European wormseed was probably known to Dioscorides, and has long been in use in various European countries under different names, such as *semen santonicæ*, *semen sanctum*, and *semen contra.* Its origin was for a long time obscure, but it is now ascertained to be the product of a composita, *Artemisia maritima*, var. *Stechmanniana*, numerous plants formerly regarded as distinct spe-



American Wormseed (Chenopodium ambrosioides, var. anthelminticum).



European Wormseed (Artemisia maritima, var. Stechmanniana).

cies being now united under the variable *A. maritima*, or sea artemisia. It grows in sandy wastes near the coast from England around the Mediterranean, covers wide tracts in the region of the Caspian, and extends to Siberia. The drug is chiefly collected on the Kirghiz steppes in northern Turkistan, and mostly finds its way into commerce through the fairs at Nizhni Novgorod. Though called a seed, the drug consists of the small unopened flower heads of the plant, which, though minute, have the structure common to the composite family, and consist of three to five florets, closely surrounded by an involucre of several scales; the heads are oblong, a tenth of an inch long, and require about 90 to weigh a grain; when rubbed they have a camphorous odor, and their taste is bitter and aromatic. The chemical composition of this wormseed is quite complex; besides 1 per cent. of a peculiar essential oil, its most important constituent is santonine, of which it yields 1½ to 2 per cent., and upon which its anthelmintic properties depend. Santonine crystallizes in colorless rectangular crystals, which when exposed to daylight split up into irregular fragments; it is sparingly soluble in water, but dissolves in three or four parts of chloroform, is inodorous, and has a bitter taste. The drug, in doses of 10 to 60 grs., is an active vermifuge, but santonine in doses of 3 to 6 grs. is preferred. In large doses it produces a singular effect upon the vision, objects appearing to those under its influence as if viewed through yellow glass; and if the dose is very large, they appear as if seen through a red medium.

WORMWOOD (probably so called from its use as an anthelmintic), a plant of the composite family, *Artemisia absinthium*, a native of Europe and somewhat naturalized in this country. It is a perennial with numerous erect stems 2 to 4 ft. high, and rather woody at base, all parts hoary with a close, almost silky down; the leaves, nearly orbicular in their general outline, are much cut into linear lobes; the numerous hemispherical heads are in panicles and nodding, and are larger than in most other species; the scales of the involucre to the heads with dry margins; the florets all fertile, the marginal ones pistillate only. All parts of the plant are intensely bitter, with a strong odor due to a greenish volatile oil, which is separated by distillation and kept in the shops as oil of wormwood. It has long been in use as a powerful aromatic tonic, and is sometimes given to destroy worms; infused in spirits, it is a popular form of bitters. The Germans use it in the place of hops, to prepare *Wermuth* beer, and the French to make a liqueur called *absinthe.* (See ABSINTH.) The ashes of the plant contain a large amount of potash in the form of carbonate, and while chemistry was but little known it was supposed to possess particular virtues; even at the present time a granular carbonate of potash is frequently called the salts of wormwood.

Wormwood (Artemisia absinthium).

WORNUM, Ralph Nicholson, an English author, born at Thornton, North Durham, Dec. 29, 1812. He was educated at University college, London, studied painting and the fine arts, and practised portrait painting for some years in London. In 1846 he was appointed to prepare the official catalogue of the national gallery, in 1848 lecturer on ornamental art in the government schools of design, in 1852 librarian and keeper of casts, and in 1855 keeper and secretary of the national gallery. He has published "The Epochs of Painting Characterized: a Sketch of the History of Painting" (2 vols., London, 1846); "Analysis of Ornament" (1856); "The Epochs of Painting: a Biographical and Critical Essay" (1864); and "The Life and Works of Hans Holbein" (1866). He edited a "Biographical Catalogue of the Principal Italian Painters" and "Lectures by Royal Academicians," and wrote the life of Turner for the "Turner Gallery."

WORONZOFF. See VORONTZOFF.

WORSAAE, Jens Jacob Asmussen, a Danish archæologist, born at Veile, Jutland, March 14, 1821. He was connected with the museum of northern antiquities from 1838 to 1843, and afterward made archæological explorations in foreign countries. In 1847 he was appointed inspector of national antiquities, and in 1861 director. From 1854 to 1865 he was also professor of Danish archæology in the university of Copenhagen. His works include *Danmark's Oldtid* (Copenhagen, 1843; English translation by Thoms, "The Primeval Antiquities of Denmark," London, 1849); *Minder om de Danske og Nordmändene i England, Skotland og Irland* (1852; English translation, "Account of the Danes in England, Ireland, and Scotland," 1852); and *Den Danske Erobring af England og Normandiet* (1863). Several of his works have been translated into German and French.

WORSTED. See WOOL, MANUFACTURES OF.

WORT. See BREWING, vol. iii., p. 259.

WORTH. **I.** A S. W. county of Georgia, bounded N. E. by Flint river and S. E. by Little river; area, about 900 sq. m.; pop. in 1870, 3,778, of whom 1,105 were colored. It is intersected by the Brunswick and Albany railroad. The surface is level and the soil sandy. The chief productions in 1870 were 84,194 bushels of Indian corn, 13,381 of oats, 24,219 of sweet potatoes, 16,665 lbs. of wool, 4,568 of rice, and 2,051 bales of cotton. There were 476 horses, 2,888 milch cows, 6,708 other cattle, 5,596 sheep, and 10,541 swine. Capital, Isabella. **II.** A N. county of Iowa, bordering on Minnesota, and drained by Shell Rock river; area, 432 sq. m.; pop. in 1870, 2,892. The surface is undulating or level, and diversified by prairie and woodland. The chief productions in 1870 were 97,156 bushels of wheat, 49,472 of Indian corn, 71,107 of oats, 9,161 of potatoes, 94,290 lbs. of butter, 5,226 of wool, and 9,839 tons of hay. There were 846 horses, 1,309 milch cows, 2,110 other cattle, 1,590 sheep, and 1,365 swine. Capital, Northwood. **III.** A N. W. county of Missouri, bordering on Iowa, and drained by Grand river; area, about 225 sq. m.; pop. in 1870, 5,004. The surface is undulating, and comprises prairie and timber lands, in nearly equal proportion; the soil is generally fertile. The chief productions in 1870 were 29,576 bushels of wheat, 375,035 of Indian corn, 71,816 of oats, 31,396 of potatoes, 32,834 lbs. of wool, 105,869 of butter, and 9,966 tons of hay. There were 2,827 horses, 6,349 cattle, 10,375 sheep, and 13,546 swine. Capital, Grant City.

WÖRTH, a small town of Alsace-Lorraine, Germany, formerly of the French department of Bas-Rhin, 10 m. S. W. of Weissenburg. The French under MacMahon were utterly defeated here, Aug. 6, 1870, by the Germans under the crown prince Frederick William. (See FRANCE, vol. vii., p. 395.)

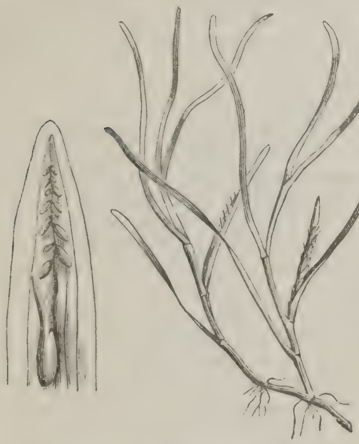
WORTH, William Jenkins, an American soldier, born in Hudson, N. Y., March 1, 1794, died in San Antonio, Texas, May 7, 1849. He entered the army as a private in 1812, became second lieutenant in 1813 and aide to Gen. Lewis, and in 1814 to Gen. Scott. At the battle of Chippewa he won the brevet of captain, and at Lundy's Lane, where he was severely wounded, that of major. In 1815 he was made captain, and from 1820 to 1828 was instructor of infantry tactics and commander of cadets at West Point. He was made major of ordnance in 1832, and colonel of infantry in 1838. In 1840 he was sent to Florida, and in 1841 took the chief command against the Seminoles, bringing the war to a final close in 1842, when he was brevetted brigadier general. In the war with Mexico he greatly distinguished himself in the battle of Monterey, in the capture of Vera Cruz, in the engagements of Cerro Gordo, Puebla, and Molino del Rey, and in the storming of the city of Mexico. For these services he was brevetted major general and received swords from congress, the state of New York, and his native county. In 1838 he had received a sword from Louisiana. After the war he was commander of the department of the southwest till his death. His remains rest beneath the memorial monument erected by the city of New York at the junction of Broadway and Fifth avenue.

WOTTON, Sir Henry, an English author, born at Bocton hall, parish of Boughton Malherbe, Kent, April 9, 1568, died at Eton in December, 1639. He was educated at Winchester and Oxford, left the university in his 22d year, and travelled several years on the continent. On his return to England he became secretary to the earl of Essex, whom he accompanied to Spain and Ireland. When Essex was charged with treason in 1601, Wotton fled to France, and in 1602 was sent by the grand duke of Tuscany to warn King James of Scotland of a plot against his life. On the death of Queen Elizabeth he returned to England, and was knighted, and in 1604 was sent ambassador to Venice. He was recalled in 1610, was sent on a mission to the United Provinces in 1615, and in 1616 was reappointed to the Venetian embassy. From 1625 till his death he was provost of Eton college, having been ordained deacon in order to hold the office. He wrote "Elements of Architecture" (1624), "The State of Christendom" (1657), &c., but is best known now by his poems. His more important works are included in the *Reliquiæ Wottonianæ*, published with his life by his friend Izaak Walton in 1651 (enlarged ed., 1685). His poems have been edited by the Rev. Alexander Dyce (1843).

WOTTON, William, an English author, born at Wrentham, Suffolk, Aug. 13, 1666, died at Buxted, Essex, Feb. 13, 1726. He entered Catharine hall, Cambridge, before he was ten years old, graduated in 1679, and obtained various preferments. He is chiefly known for his "Reflections upon Ancient and Modern Learning" (London, 1694), which originated the controversy about the "Epistles of Phalaris," and called forth Swift's "Battle of the Books." He also published "A History of Rome" (1701), and "Discourses relating to the Traditions and Usages of the Scribes and Pharisees" (2 vols., 1718); and after his death were published "Discourse on the Confusion of Language at Babel," and *Cyfreithjeu Hywel DDa ac Eraill*, an edition of the ancient Welsh laws, with a Latin translation (1730).

WOUVERMAN, Philip, a Dutch painter, born in Haarlem in 1620, died there, May 19, 1668. He was instructed by his father and by Wynants, and struggled with adversity while his works enriched the dealers. He is said to have destroyed all his studies for fear that they might induce his son to become a painter. He excelled chiefly in hunting parties and in horses, and nearly all his pictures contain either a white or a gray horse. His skies, foregrounds, and foliage are executed in the best style of his school. He left upward of 800 carefully finished pictures, best described in Smith's catalogue (London, 1829). Many of his pieces have been engraved, especially by J. Moyreau, *Œuvres de Philippe Wouverman d'après ses meilleurs tableaux* (Paris, 1737). There are many of his masterpieces in Dresden and in the Louvre at Paris; his largest battle picture is in the royal museum at the Hague.

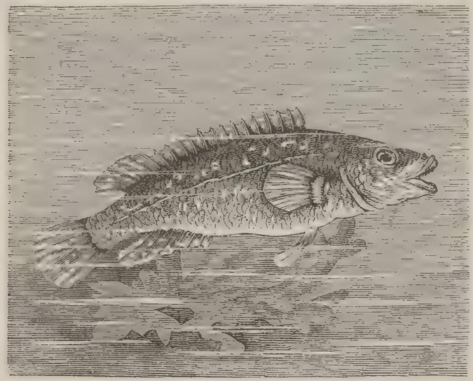
WRACK GRASS, or **Grass Wrack,** the plant *zostera marina*, of the pond-weed family (*naiadaceæ*), growing at or beyond low-water mark upon sandy or muddy sea shores in most parts of the world. Wrack is an old Norse name for sea weed thrown ashore, this being called grass wrack in distinction from the proper sea weeds or algæ. Along our coasts it is usually called eel grass (see VALLISNERIA for the eel grass of fresh water), and incorrectly sea weed; on the Florida coast it is known as aloa. The genus *zostera* (Gr. ζωστήρ, a band, in reference to the long and narrow leaves) contains but two species; they are marine herbs with jointed creeping stems, and long grass-like leaves which grow completely under water, or are covered at high tide; the monœcious flowers have both kinds enclosed in the sheathing base of a leaf which serves as a spathe; they are arranged in two rows upon one side of a narrow leaf-like spadix; the staminate consist of single, ovate, one-celled, sessile anthers; the fertile of oblong ovaries, attached near their apex, and terminated by two long, bristle-like styles, and in *Z. marina* ripening into an oblong ribbed seed, or nutlet. The other species, *Z. nana*, found on the shores of western Europe, is seldom a foot long, and has smooth seeds. Wrack grass is very abundant in the bays and inlets of the coast, and is often washed up in large quantities by the tide; it is collected with the true sea weeds for a fertilizer; it is also used to protect tender plants in winter, and to place around cellar walls to keep out the frost. In Holland it is utilized in the construction of dikes. When dried the leaves have considerable toughness, and they make an excellent material with which to pack glass and china ware; dried and baled, it is an article of trade, being used by upholsterers to stuff cushions, mattresses, &c.; but it is not sufficiently durable, and is only used for the cheapest kind of work. The fibre has been used to some extent in paper making.


Wrack Grass (Zostera marina).

WRANGEL, Karl Gustaf, count, a Swedish soldier, born Dec. 13, 1613, died in the island of Rügen in July, 1676. In the thirty years' war he served under Gustavus Adolphus, Bernhard of Weimar, Baner, and Torstenson. In 1644, as commander in the navy, he defeated the Danish squadron off Femern. He was made a count in 1645. In 1646 he succeeded Torstenson as chief commander of the army in Germany, and in 1647, in conjunction with Turenne, he compelled the elector Maximilian of Bavaria to conclude an armistice. When the latter broke it, he defeated him and his Austrian allies near Augsburg in May, 1648, and occupied Bavaria. The war being ended in the latter part of the same year, he retired from active service, but in 1655 joined Charles X. in his Polish campaign, and in 1656 commanded in the battle of Warsaw. In 1658, as high admiral, he compelled the surrender of the fortress of Cronburg, and would have taken Copenhagen but for the reënforcement of the Danish by a Dutch squadron. He prevented the Danes, however, from taking the island of Fünen in 1659. At the close of the war in 1660 he became grand marshal and generalissimo. When Sweden joined France in 1674 against Germany, Wrangel with 16,000 men suddenly invaded the electorate of Brandenburg; but his health failing, his troops were defeated and obliged to evacuate the territory and part of Pomerania, and he resigned.

WRANGELL, Ferdinand, baron, a Russian traveller, born in Esthonia about 1795, died in Dorpat, June 6, 1870. He was a naval officer, and in 1820–'23 commanded a sledge expedition to the Polar sea, N. of East Siberia, in conjunction with Anjou. They penetrated to lat. 72° 2′ N., and reported an open sea in the distant north. In 1825–'7 he made a voyage round the world. From 1829 to 1834 he was governor of Russian America, and subsequently he held office in the navy department at St. Petersburg till 1849, when the Russian American company chose him as director. In 1854 he returned to the navy department as chief of the hydrographical division; in 1858 he was adjoined to the imperial council with the rank of admiral and general aide-de-camp. An account of his arctic expedition was prepared in German by Engelhardt (2 vols., Berlin, 1839), after the traveller's diaries, and in 1840 was translated into English by Mrs. Sabine, under the title of "Wrangell's Expedition to the Polar Sea in 1820–'23." A fuller narrative was published in Russian (2 vols., St. Petersburg, 1841). In 1867 Capt. Long, in traversing the part of the Polar sea navigated by the Russian explorer, discovered a large tract of land, which Wrangell had endeavored to reach, and which is called after him Wrangell Land.

WRASSE, the common name of the spiny-rayed fishes of the family *labridæ* comprised in the genus *labrus* (Cuv.). The mouth is protrusible, with double large and fleshy lips, and jaws armed with formidable conical teeth in a single row, or with smaller and crowded ones in a second row; no teeth on palate, but broad grinders on the coalescent lower pharyngeal bones; scales large, thin, and cycloid, with lateral line interrupted, and cheeks and gill covers scaly; there is a single long dorsal, the spines of the anterior portion being surmounted by short membranous filaments, and the posterior having soft and split rays; ventrals under pectorals; air bladder simple and strong, and stomach without pyloric cæca. The species are numerous, especially in the tropical seas, and are of moderate size, stout form, and beautiful colors; they are also called rock fish and old wives. They are generally seen in troops among the rocks, hiding under sea weeds, and feeding on crustaceans, mollusks, and sea urchins; they bite eagerly, and are often caught by baits intended for other fish, as their flesh is not much esteemed, being generally used as bait. In the temperate regions they spawn in April, the young, about an inch long, being numerous about the rocks in summer; some of the Mediterranean species spawn twice a year. One of the most common species in the temperate seas of Europe is the ballan wrasse (*L. maculatus*, Bloch), about 18 in. long, varying greatly in color, being blue or green with orange spots, or entirely of different shades of the latter; the colors change rapidly after death. The striped wrasse (*L. variegatus*, Gmel.) is of a general orange color, reddish on the back, yellowish below, with the sides striped with blue, and the fins blue and orange; the female is very unlike the male; it is found in the same waters. The rainbow wrasse (*julis vulgaris*, Cuv.) has the lateral line uninterrupted and the head without scales; the colors are varied, orange, blue, yellow, and silvery; it is common in the Mediterranean, and at Nice is considered good eating. The gilt-headed wrasse (*crenilabrus tinca*, Risso) has the edge of the preoperculum denticulated; it is about 6 in. long, red varied with green, fins greenish blue, and head blue, with reddish orange stripes and spots on the cheeks; it is found on the English coasts. These fish are represented on the North American coast by the salt-water perch and the tautog or black fish.



Ballan Wrasse (Labrus maculatus).

WRATISLAW, A. H. See supplement.

WRAXALL. I. Sir Nathaniel William, an English author, born in Bristol, April 8, 1751, died in Dover, Nov. 7, 1831. He went to Bombay in 1769 in the civil service of the East India company, and in 1771 accompanied the expedition against Guzerat and Baroach as judge advocate and paymaster. He returned to Europe in 1772, travelled several years on the continent, entered parliament in 1780, and was created a baronet in 1813. He wrote "Cursory Remarks made in a Tour through some of the Northern Parts of Europe" (1775); "Memoirs of the Kings of France of the House of Valois, to which is added a Tour through the Western, Southern, and Interior Provinces of France" (1777); "The History of France from the Accession of Henry the Third to the Death of Louis the Fourteenth" (3 vols. 4to, 1795); "Correspondence between a Traveller and a Minister of State, October and November, 1792" (8vo, 1796); "Memoirs of the Courts of Berlin, Dresden, Warsaw, and Vienna" (1799; 2d ed., 2 vols., 1800); "History of France from the Accession of Henry III. to the Death of Henry IV." (2d ed., 6 vols., 1814); "Historical Memoirs of my own Time" (3 vols. 8vo, 1815; new ed., 4 vols., 1836); and "Posthumous Memoirs of his own Time" (2d ed., 3 vols., London, 1836). **II. Sir Frederick Charles Lascelles,** an English author, grandson of the preceding, born in Boulogne in 1828, died in London, June 11, 1865. He was educated at Oxford, and in 1855 was appointed assistant commissary of the field train in the Turkish contingent, with the rank of captain. He served in this capacity at Kertch until the close of the Crimean war, and published "Camp Life" (12mo, London, 1860). He had charge of the "Naval and Military Herald" in 1858, and from January, 1860, to March, 1861, was editor of "The Welcome Guest." He edited the despatches of Sir James Outram (privately printed), and published a "Handbook to the Armies of Europe" (1855); "Wild Oats," a novel (1857); "Armies of the Great Powers" (1859); "Only a Woman," a novel (1860); "Life in the Sea" (1860); with Robert Wehrhan, "Memoirs of Queen Hortense, Mother of Napoleon III." (2 vols. 12mo, 1862); "Married in Haste," a novel (1862); "Military Sketches" (1864); "Historic By-ways" (1864); "Mercedes," a tale of the Mexican war (1865); and many other works and translations.

WREN, the name commonly applied to the diminutive tenuirostral birds of the creeper family and genus *troglodytes* (Vieill.); they come near the dentirostral birds, and by some have been placed by the side of the golden-crested warbler or kinglet (*regulus cristatus*, Ray), also itself called wren. In the wrens the tarsi are long and slender; the toes long, the outer longer than the inner, the latter being free; bill slightly curved, with tip entire; wings short and rounded, the fourth to sixth quills equal and longest; tail short, rounded, and usually erect. There are about 50 species in various parts of the globe, of which one of the best known is the common European or kitty wren (*T. parvulus*, Koch). It is 4 in. long, reddish brown above, barred with dusky and white spots on the wings, and yellowish white below. It is very lively, frequenting gardens and hedges, and flitting from bush to bush with a direct flight, in search of insects, seeds, and fruits; the males in spring and summer have a loud sweet song. The nests are begun early in April, in holes and crevices of walls, banks, and roofs of thatch, among climbing plants or on branches of trees, and are composed principally of hay and moss, lined with feathers; they are comparatively large, oval, domed above, with the opening at the end or on the side; the eggs are 6 to 10, and even 16, and incubation lasts 10 days, the males feeding the females, and both very attentive to the young; two broods are raised in a season. It is a permanent resident all over Europe, most abundant in the north.—Of the North American true wrens, the largest is the great Carolina (*thryothorus Ludovicianus*, Bonap.), 6 in. long and 8¼ in. in alar extent; it is reddish brown above, brightest on the rump, the wings and tail barred with darker; throat and streak over eyes whitish; lower parts pale yellowish rusty with under tail coverts barred with black. It is found as far north as Pennsylvania, west to Missouri, and south to Texas; it is very lively, and fond of the vicinity of water. Many are destroyed by minks and weasels; the eggs are 5 to 8, broad oval, grayish white with reddish brown spots; two or three broods are reared in a season.—The best known species is the house wren (*troglodytes ædon*, Vieill.), 5 by 6½ in.; it is reddish brown above, barred with dusky, and pale fulvous white below with a light brownish tinge across the breast. It is found in the eastern United States to Missouri; it is much more familiar than the European wren, and a far superior songster; it builds near houses, in boxes prepared for it, and sometimes in strange places, as in unused carriages, or the sleeve of a coat forgotten in an outhouse; the males are very pugnacious, and have a special antipathy to cats, the martin, bluebird, and swallows; the eggs are five or six, pale reddish, and two broods are raised in a season.—There are several other allied genera in western South America, Asia, and Africa. The lyre bird belongs to the group of wrens. (See LYRE BIRD.)

Kitty Wren (Troglodytes parvulus).

House Wren (Troglodytes ædon).

WREN, Sir **Christopher,** an English architect, born at East Knoyle, Wiltshire, Oct. 20, 1632, died at Hampton Court, Feb. 25, 1723. His father was chaplain in ordinary to Charles I. and dean of Windsor. He graduated at Oxford in 1650, received the degree of M. A. in 1653, and became a fellow of All Souls' college. He had already made many inventions, including the wheel barometer and mezzotint engraving (according to his son), and had written papers on astronomy, on instruments of scientific application, on ship building, fortification, harbors, whale fishing, the easiest method of finding the longitude, and many other topics. He now became the associate of a body of scientific men whose meetings laid the foundation of the royal society. In 1657 he was elected professor of astronomy in Gresham college, London, and three years later Savilian professor of astronomy at Oxford. In 1661 he was appointed assistant to Sir John Denham, the surveyor general. In 1663 he designed the chapel of Pembroke college, Cambridge, and in the same year was commissioned to make a survey of St. Paul's cathedral, with a view to restoring or rebuilding it so as to adapt the whole structure to the famous Corinthian portico added by Inigo Jones. His plans for the restoration of the cathedral were soon prepared, and gave rise to protracted discussions, in the midst of which occurred the great fire of London (1666). By royal command Wren made an exact survey of the whole burnt district, and submitted a scheme which provided for wide and regular streets, frequent squares and piazzas, and a line of commodious quays along the Thames. The property owners were indifferent to his suggestions, and the same narrow thoroughfares were preserved as of old; but he found abundant employment in the erection of public buildings and churches in lieu of those destroyed by the fire. The first of these in importance is the new cathedral of St. Paul's. The first plan for this edifice designed by Wren was in the form of a Greek cross, and of a single order in height, with a dome as large as that of St. Peter's. But the duke of York, afterward James II., with a view to the future introduction of the ceremonials of the Roman Catholic service, insisted upon certain modifications, to which Wren was compelled to conform, and which resulted in the adoption of the present form of the Latin cross. The first stone was laid June 21, 1675, and the last was laid 35 years later in Wren's presence, by his son Christopher. The interior decoration according to Wren's designs was never completed, but is now (1876) in progress. Besides St. Paul's, he designed 53 churches or more in London, of which 50 were intended to replace those destroyed in the great fire. Among the most famous are St. Mary-le-Bow, St. Bride's in Fleet street, and St. Stephen's in Wallbrook, the last named being particularly noted for its exquisitely beautiful interior. His remaining works include the royal exchange and the custom house, both subsequently burned, the Monument, Temple Bar, and the college of physicians, all in London; the hospitals at Greenwich and Chelsea; large additions to the palaces of Hampton Court and St. James's; the west front and towers of Westminster abbey; a palace at Winchester for Charles II., now used as barracks; the gateway tower of Christ Church college, Oxford, and the Sheldonian theatre and Ashmolean museum in the same city; besides various college chapels and other buildings for the two universities. On the accession of George I. court influence was brought to bear against him, and at the age of 86 he was removed from the office of surveyor general, which he had held for 49 years. He was buried in the crypt of St. Paul's, and a black marble slab, with the inscription, *Si monumentum requiris, circumspice*, marks his tomb. He was knighted by Charles II. at Whitehall in 1674, and between 1685 and 1713 represented various boroughs in parliament. He was elected president of the royal society in 1680, and appointed comptroller of the works in Windsor castle in 1684. The most authentic record of his life is to be found in the "Parentalia," begun by his son Christopher, and completed by his grandson Stephen Wren (1750).

WRIGHT. **I.** A central county of Minnesota, bounded N. E. by the Mississippi and S. E. by Crow river and its S. fork; area, 708 sq. m.; pop. in 1870, 9,457; in 1875, 13,775. The surface is undulating and diversified by prairies, forests, and numerous small lakes. The St. Paul and Pacific railroad traverses it. The chief productions in 1870 were 134,095 bushels of wheat, 69,572 of Indian corn, 97,282 of oats, 51,748 of potatoes, 115,675 lbs. of butter, 6,964 of wool, and 6,961 tons of hay. There were 1,082 horses, 2,050 milch cows, 3,987 other cattle, 2,612 sheep, and 2,946 swine. Capital, Buffalo. **II.** A N. central county of Iowa, intersected by the Boone and Iowa rivers; area, 625 sq. m.; pop. in 1870, 2,392. The surface is generally undulating and the soil fertile. The chief productions in 1870 were 72,558 bushels of wheat, 85,284 of Indian corn, 55,859 of oats, 8,852 of potatoes, 63,354 lbs. of butter, and 8,053 tons of hay. There were 947 horses, 998 milch cows, 1,454 other cattle, 785 sheep, and 1,229 swine. Capital, Clarion. **III.** A S. county of Missouri, drained by the Gasconade river and the head streams of White river; area, about 650 sq. m.; pop. in 1870, 4,508, of whom 26 were colored. The surface is moderately hilly and the soil fertile. The chief productions in 1870 were 42,316 bushels of wheat, 247,735 of Indian corn, 29,286 of oats, 13,109 of potatoes, 36,799 lbs. of butter, 11,726 of wool, and 37,551 of tobacco. There were 1,931 horses, 1,528 milch cows, 4,065 other cattle, 6,647 sheep, and 14,874 swine. Capital, Hartville.

WRIGHT, Elizur, an American abolitionist, born in South Canaan, Litchfield co., Conn., Feb. 12, 1804. He graduated at Yale college in 1826, and for two years was a teacher at Groton, Mass. From 1829 to 1833 he was professor of mathematics and natural philosophy in Western Reserve college, Hudson, Ohio. He removed to New York in 1833, and was for five years secretary of the American anti-slavery society, editing in 1834–'5 a paper called "Human Rights," and in 1835–'8 the "Quarterly Anti-Slavery Magazine." He removed to Boston in 1838, and in April, 1839, became editor of the "Massachusetts Abolitionist." In 1846 he established the "Chronotype" newspaper, which he conducted till it was merged in the "Commonwealth" (1850), of which also he was for a time the editor. From 1858 to 1866 he was insurance commissioner of Massachusetts. Mr. Wright has published a translation in verse of La Fontaine's "Fables" (2 vols. 8vo, Boston, 1841), "A Curiosity of Law" (1866), and many pamphlets and reports.

WRIGHT (D'Arusmont), Frances (commonly called FANNY), a Scottish reformer, born in Dundee, Sept. 6, 1795, died in Cincinnati, Ohio, Dec. 14, 1852. She was left an orphan at the age of nine, and was indoctrinated by her guardian with ideas founded on the philosophy of the French materialists. She travelled in the United States in 1818–'20, and published "Views on Society and Manners in America" (London, 1821). In 1825 she again came to America, and purchased 2,000 acres of land in Tennessee, including part of the present site of Memphis, where she established a colony of emancipated slaves, who were afterward sent to Hayti. In 1833–'6 her lectures upon negro slavery and other social institutions attracted large and enthusiastic audiences, and led to the establishment of what were called "Fanny Wright" societies. Her visits were subsequently extended to the principal cities of the Union, but the enunciation of views similar to those contained in her "Few Days in Athens" met with very decided opposition. About 1838 she married in France M. D'Arusmont, but soon separated from him, and resided in Cincinnati till her death. She published "Altorf," a tragedy (Philadelphia, 1819); "A Few Days in Athens," a defence of the philosophy of Epicurus (London, 1822); and "Lectures on Free Inquiry" (New York, 1829; 6th ed., 1836).

WRIGHT, Silas, an American statesman, born in Amherst, Mass., May 24, 1795, died in Canton, St. Lawrence co., N. Y., Aug. 27, 1847. He graduated at Middlebury college in 1815, was admitted to the bar in 1819, and settled at Canton. In 1820 he was appointed surrogate. In 1823 he was elected a member of the state senate as a democrat. Early in 1827 he made a report to the senate, in which he developed the financial policy which he subsequently enforced as a political measure while governor. He was elected a member of the twentieth congress, and there advocated the protective tariff of 1828, although subsequently he became an advocate of a tariff for revenue only. He also voted for the appointment of a committee to inquire into the expediency of abolishing slavery in the District of Columbia. He was controller of New York from 1829 to 1833, when he was chosen as the successor of Mr. Marcy for four years in the United States senate, of which he remained a member by reëlection for nearly 12 years. He supported Mr. Clay's compromise bill in 1833; defended President Jackson's removal of the deposits; opposed the recharter of the United States bank; voted against Mr. Calhoun's motion not to receive a petition for abolishing slavery in the District of Columbia, and in favor of excluding from the mails all "printed matter calculated to excite the prejudices of the southern states in regard to the question of slavery;" opposed the distribution among the states of the surplus federal revenues; supported the independent treasury scheme of President Van Buren; voted in 1838 against the resolution offered by Mr. Rives of Virginia, declaring that the citizens of the states had no right to interfere with the question of slavery in the federal territories, and that the people of those territories had the exclusive right to settle that question for themselves; opposed the bill requiring the states to choose members of congress by single districts; and voted for the tariff of 1842, and against the treaty for the annexation of Texas. In 1844 he was elected governor of New York. He opposed in 1845 the calling of a convention to revise the state constitution, preferring the adoption of amendments then proposed; vetoed a bill appropriating money for works on the canals; and recommended legislation against the anti-renters, and on occasion of disturbances produced by them in Delaware co. in 1845 proclaimed the county to be in a state of insurrection and called out a military force. He was renominated in 1846, but was defeated, and returned to his farm in Canton. He was plain in his speech and habits.

WRIGHT, Thomas, an English antiquary, born in Wales, April 21, 1810. He graduated at Cambridge, and was one of the founders of the Camden society and of the British archæological association, and a member of the Percy society and the Shakespeare society. In 1842 he was chosen a corresponding member of the French academy of inscriptions. He made discoveries on the site of the ancient city of Uriconium (see Wroxeter), and was selected by Napoleon III. to translate his history of Julius Cæsar (2 vols., 1865–'6). His works include "Political Songs of England from John to Edward II." (London, 1839); "Biographia Britannica Literaria, Anglo-Saxon and Anglo-Norman Periods" (2 vols. 8vo, 1842–'6); "England under the House of Hanover," illustrated from caricatures and satires (2 vols. 8vo, 1848; new ed., 1852); "History of Ireland" (3 vols., 1848–'52, and 1857); "The Celt, the Roman, and the Saxon, a History of the Early Inhabitants of Britain down to the Conversion of the Anglo-Saxons" (12mo, 1852; 3d revised and enlarged ed., 1875); "Dictionary of Obsolete and Provincial English" (2 vols., 1857); "History of France" (2 vols., 1858–'60); "History of Domestic Manners and Sentiments in England during the Middle Ages" (small 4to, 1862); "History of Caricature and Grotesque in Literature and Art" (1865); "Womankind in Western Europe" (1869); and "Uriconium, a Historical Account of the ancient Roman City" (1872).

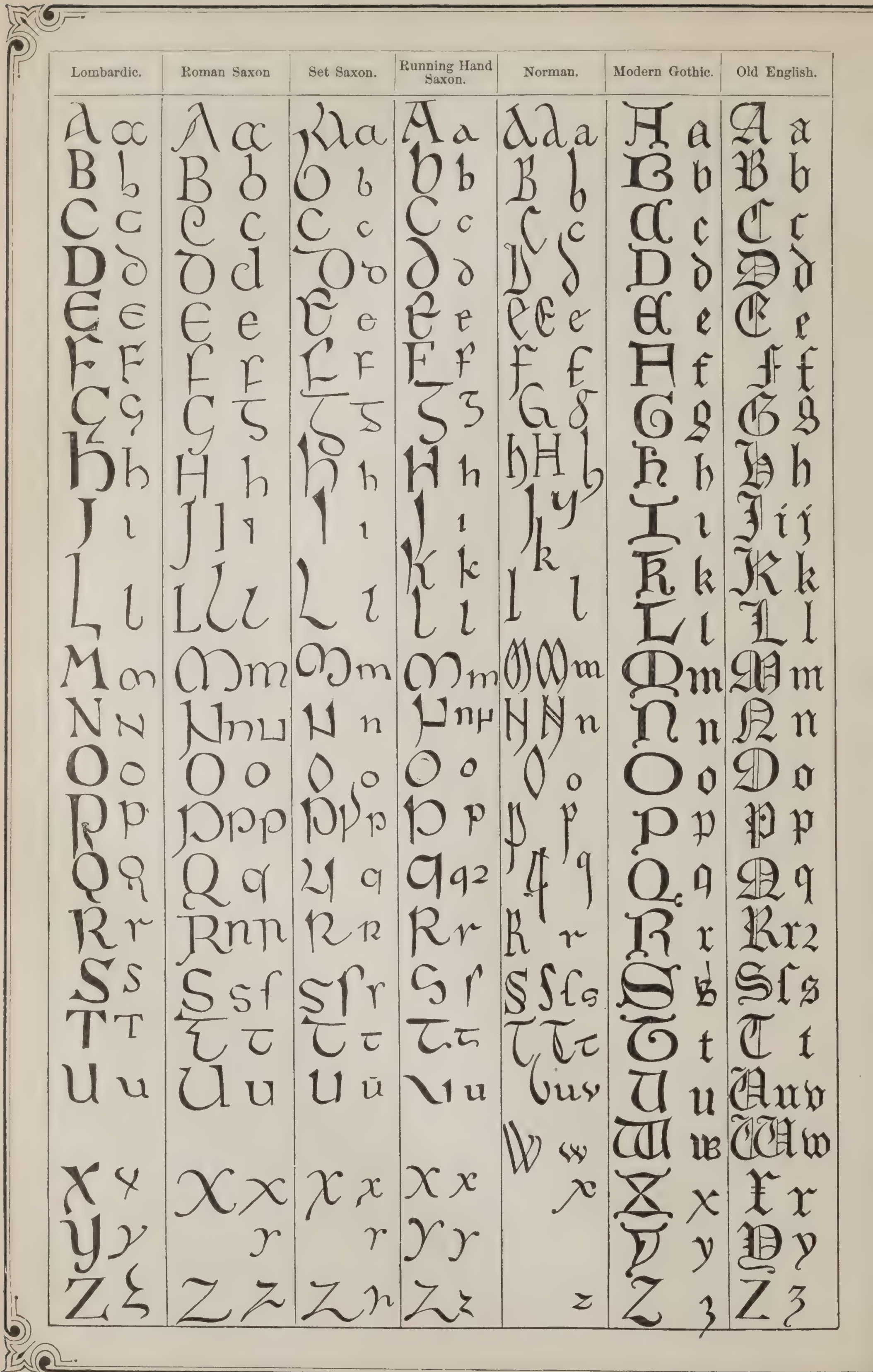
WRIGHT, William, a British orientalist, born in Bengal, India, Jan. 17, 1830. He was educated in Scotch universities and at Halle, became professor of Arabic in University college, London, in 1855, in Trinity college, Dublin, in 1856, and in 1870 at Cambridge, after being in the interval connected with the department of manuscripts in the British museum. He has edited and translated into English many Arabic works, including the *Kamil* of El-Mubarrad, for the German oriental society (Leipsic, 1864–'74), an Arabic grammar (2d ed., 1875), and Caspari's Arabic grammar, with numerous additions and emendations (2d ed., revised and enlarged, 1875). His other works comprise "Catalogue of the Syriac Manuscripts in the British Museum" (3 vols., 1870–'72); "Apocryphal Acts of the Apostles," Syriac and English (2 vols., 1871); and "Oriental Series of Facsimiles of Ancient Manuscripts" (1876 *et seq.*).

WRISBERG, Heinrich August, a German anatomist, born at Andreasberg, Hanover, June 20, 1739, died March 29, 1808. He graduated in medicine at Göttingen in 1763, became a professor, and taught midwifery and anatomy. His name is connected with the "cartilages of Wrisberg," or the "cuneiform cartilages," two small elongated bodies, included in the aryteno-epiglottidean folds of mucous membrane in the larynx, first described by him, and with the "lesser internal cutaneous nerve," or "nerve of Wrisberg," a branch of the brachial plexus which is distributed to the integument of the inside of the arm above the elbow. He published treatises on respiration and animal heat, the anatomy of the embryo, the infusorial animalcules, the fifth pair of cranial nerves, the nerves of the abdominal viscera, the brachial nerves, the gravid uterus, Fallopian tubes, ovaries, and corpus luteum.

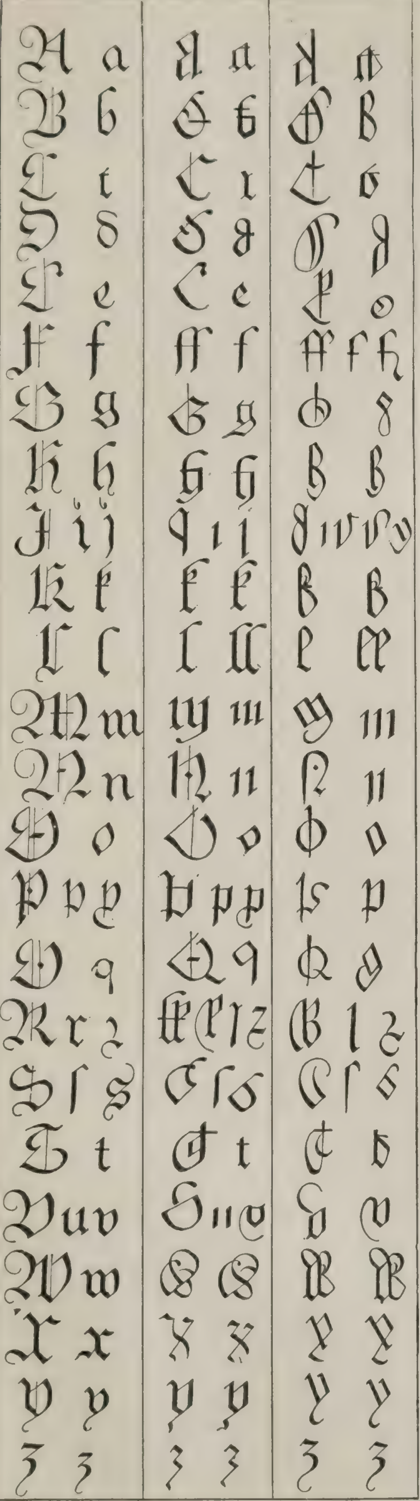
WRIT (in Norman French and law Latin, *breve*), a word used from very early times to designate any judicial process or precept, by which the sovereign, whether state or person, commands the proper executive officer, usually the sheriff, or in the courts of the United States the marshal, to do some act. It must be attested by a judge, usually the chief justice of the court to which it is returnable, who thus bears testimony to the fact that the command is lawful and issues from the sovereign; and this attestation of the court or judge is certified by the clerk of the court. Writs were formerly much more numerous than now. Those still in use may be divided into: 1, original writs, by which all suits at law are begun; 2, writs of mesne process, which issue in the intermediate proceedings; and 3, writs of execution, by which the final judgment or decree of the court is carried into operation.

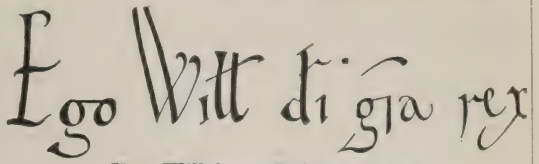
WRITERS' CRAMP. See SCRIVENERS' PALSY.

WRITING, the art of expressing ideas by visible signs or characters inscribed on some material. It is either ideôgraphic or phonetic. Ideographic writing may be either pictorial, representing objects by imitating their forms, or symbolic, by indicating their nature or proportions. Phonetic writing may be syllabic or alphabetic; in the former each character represents a syllable, in the latter a single letter. Of the origin of this art nothing is positively known. The Egyptians ascribed it to Thoth; the Greeks to Mercury or Cadmus; and the Scandinavians to Odin. The first step toward writing was probably the rude pictorial representation of objects, without any indication of the accessories of time or place; the next the application of a symbolic signification to some of these figures, so that the picture of two legs, for example, represented not only two legs, but also the act of walking. Pictures, abbreviated for convenience, gradually became conventional signs, and in time these characters were made to stand for the sounds of spoken language.—The various systems of writing of the ancient world had probably at least three different sources, the Egyptian, the Assyrian, and the Chinese systems, all of which were originally hieroglyphic. The Egyptians practised four distinct styles of writing, the hieroglyphic, hieratic, demotic or enchorial, and Coptic. Hieroglyphic writing, which was in use much earlier than 3000 B. C., was probably at first entirely ideographic; its symbols became gradually used to represent abstract ideas, and in time some acquired a phonetic value. The phonetic characters are both syllabic and alphabetic. In the latter pictorial figures are used to express the initial letters of the words which they represent; for example, the figure of an eagle (*akhom*) stands for *a*, of an owl (*mulag*) for *m*, &c. The hieratic writing, which probably came into use before 2000 B. C., was a simplified form of the hieroglyphic style, in which the pictorial symbols developed through a stage of linear hieroglyphs into a kind of cursive hand. The demotic or enchorial writing was a still simpler form of the hieroglyphic, and a nearer approach to an alphabetic system. It was in use from about the 7th century B. C. till the 2d century A. D., when it was gradually superseded by the Coptic, which grew out of the hieratic and demotic under Greek influences. (See EGYPT, LANGUAGE AND LITERATURE OF, and COPTIC LANGUAGE.) The Ethiopians also used hieroglyphs similar to those of the Egyptians, and their current written language resembled the Egyptian demotic, but its alphabet had fewer symbols. At a later period a third graphic system, somewhat analogous to the Coptic, came into use, which may be called Ethiopic Greek. For the present Ethiopic or Abyssinian system, see ETHIOPIA, LANGUAGES AND LITERATURE OF. With what people the Assyrian cuneiform or sphenographic system of writing originated is not known, but it was originally without doubt a hieroglyphic system, and became gradually modified by the different nations which occupied the Assyrian empire, until it assumed the form of the present known inscriptions. There are three classes of cuneiform characters, the Assyrian or Babylonian, the Scythian or Median, and the Persian. The first is the most complicated, containing from 600 to 700 symbols; the second is less complicated, but contains about 100 symbols, or three times as many as the third, which is almost purely alphabetic. (See CUNEIFORM INSCRIPTIONS.) For the Chinese graphic system, see CHINA, LANGUAGE AND LITERATURE OF. Of these three original systems, the Egyptian is by far the most important, for from its hieratic symbols was pro-

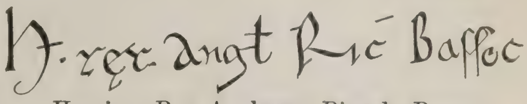

Lombardic.
Roman Saxon
Set Saxon.
Running Hand Saxon.
Norman.
Modern Gothic.
Old English.

Set Chancery. | Common Chancery. | Court Hand. | Specimens of Writing from Charters of English Kings.

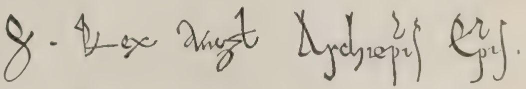




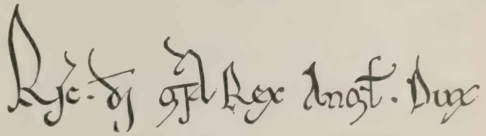
Ego Willelmus Dei gratia Rex
WILLIAM I.



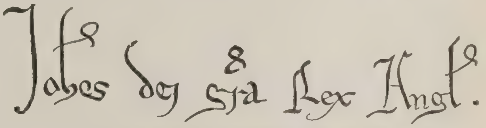
Henricus Rex Anglorum Ricardo Basset
HENRY I.



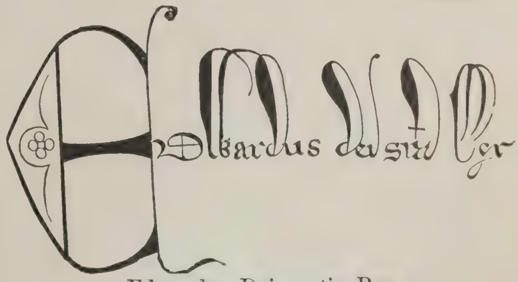
Stephanus Rex Anglorum Archiepiscopis Episcopis
STEPHEN.



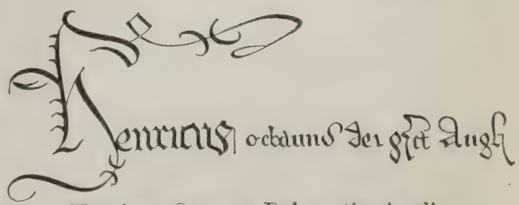
Ricardus Dei gratia Rex Angliæ Dux
RICHARD I.



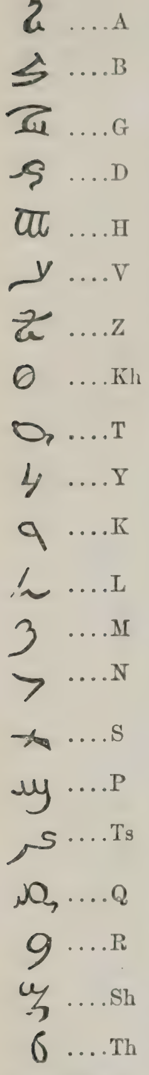
Johannes Dei gratia Rex Angliæ
JOHN.



Edwardus Dei gratia Rex
EDWARD III.



Henricus Octavus Dei gratia Angliæ
HENRY VIII.



Hieratic Alphabet.

bably derived the Phœnician alphabet, the parent of almost all the principal graphic systems of the world. The Egyptians never entirely accomplished the separation of ideograms and phonetic symbols, but the Phœnicians adopted only the latter, and thus originated the first purely alphabetic system of writing. M. François Lenormant distinguishes five main branches of the Phœnician alphabet, viz.: 1, the Semitic, which subdivides into two groups, the Hebrew-Samaritan and the Aramæan, the latter including Palmyrene, Pamphylian, the square Hebrew characters, Estranghelo and the other Syrian alphabets, the Sabæan or Mendaitic, the Auranitic, the Nabathæan, and the Arabic, including the Cufic and *neskhi* or copyhand; 2, the central or Greek, comprising the various Hellenic alphabets and their derivatives, the latter subdividing into the Albanian, Asiatic (Asia Minor), and the Italian; 3, the western, including but a single family, comprising the systems of writing which grew out of the spread of the Phœnician alphabet in Spain; 4, the northern or Runic (see RUNES); 5, the Indo-Homerite (Himyarite), which seems to have had its origin in southern Arabia, and to have spread thence to Africa, Ariana, and India, the Indian branch giving rise to the ancient Mâgadhî alphabet, the supposed parent of the Dêvanâgarî or written Sanskrit, the Pâlî, and many others. The first or Semitic branch has been treated under SEMITIC RACE AND LANGUAGES, and ARABIC LANGUAGE AND LITERATURE. Of the central branch, the Italian subdivision is the parent of the Lombardic, Visigothic, Anglo-Saxon, Gallic, Merovingian, and German graphic styles, all of which were in use before Charlemagne, and of those which followed him, including the Caroline, the Capetian, and the modern Gothic. The Roman letters were used in Italy until the latter part of the 6th century, when the Lombardic style was introduced. This was also sometimes called Roman, because used by the popes in their bulls; it continued in use until the 13th century. The Visigothic style, carried into Spain by the Visigoths, was legally abolished in 1091, and Latin letters were adopted for all public instruments. In France the Merovingian style prevailed from the close of the 6th century to the end of the 8th. Charlemagne introduced the Caroline, which, having degenerated before the close of the 10th century, was restored by Hugh Capet, and was subsequently called the Capetian. It was in use in England, France, and Germany till the middle of the 12th century, when the modern Gothic spread over all Europe. The present German alphabet is a modification of this. There are no traces of writing in Britain before the Roman conquest, when Latin letters were introduced. What is called the Roman-Saxon, resembling the Roman, prevailed until the middle of the 8th century; the set Saxon succeeded it, lasting until the middle of the 9th; this was followed by the running-hand Saxon of the time of Alfred; the mixed Saxon, combining the Roman, Lombardic, and Saxon letters; and the elegant Saxon, which was introduced in the 10th century, and did not become obsolete until the middle of the 12th. The charters which remain in this style are remarkable for their small, round, neat, and extremely legible characters. The Norman style, quaint, affected, illegible, and composed of letters nearly Lombardic, came in with William the Conqueror. The modern Gothic dates in England from the 12th century; the old English from the middle of the 14th; the set chancery and common chancery from the latter part of the same century. The English court hand, a barbarous corruption of the Norman, was contrived by the lawyers in the 16th century, and lasted till the reign of George II., when it was abolished by law. In the northern parts of Ireland and Scotland characters similar to the Saxon prevailed until the end of the 16th century. The Russian alphabet is a modified form of that invented by the missionary Cyril for the use of the Slavic tribes of Bulgaria and Moravia, among whom he preached the gospel in the 9th century. It is founded upon the Greek alphabet, but that not being sufficient to express all the Slavic sounds, he added to it numerous symbols. It was modified by Peter the Great, who reduced the number to 36 characters. (See GLAGOLITIC, and RUSSIA, LANGUAGE AND LITERATURE OF.) The Wallachs adopted the Cyrillic alphabet in the 15th century, but further diminished it to 27 symbols; and since 1856 the Latin alphabet has mostly supplanted it. For the Mexican picture writing and the Central American hieroglyphs, see HIEROGLYPHICS. The Japanese graphic system, which is a modification of the Chinese, is treated under JAPAN, LANGUAGE AND LITERATURE OF.—The utmost diversity exists among different nations in the manner or direction of writing; but in general the Semitic races wrote from right to left, and the Aryan from left to right. The Egyptian hieroglyphs are sometimes without any arrangement, but are generally written either in columns or horizontal lines, according to the shape of the surface to be inscribed; when horizontal, they are sometimes to be read from right to left and sometimes from left to right, the figures of men and animals always being turned toward the beginning of the line. The hieratic and demotic characters are always written from right to left. The Ethiopic system of writing was originally from right to left, but it was early changed to the opposite direction. The Himyaritic inscriptions read from right to left, but sometimes in the manner called *boustrophedon*, first from left to right and then from right to left (Gr. *βουστροφηδόν*, turning like oxen in ploughing). The cuneiform inscriptions are always from left to right. The Chinese and Japanese write in columns, beginning at the top and passing from right to left. The Mexican picture writing was also in columns, but read from the bottom upward. The Greeks at first imitated the Phœnicians and wrote from right to left; from this they passed to the *boustrophedon* style, and finally, about the middle of the 5th century B. C., to the modern European method. (For the distinctions between capitals, uncials, and cursives, see MANUSCRIPT; and for methods of pointing, see PUNCTUATION.) The various materials used in writing are treated under BOOK, INK, PAPER, PAPYRUS, PARCHMENT, PEN, AND PENCIL.—The necessity of some rule for the reduction of unwritten languages and foreign graphic systems to a uniform orthography in Roman characters early led to attempts at the construction of a standard alphabet. The first who gave especial attention to the subject was Sir William Jones, who published in the "Transactions" of the Asiatic society (Calcutta, 1788) his essay "On the Orthography of Asiatic words in Roman Letters." He discarded the English vowel system and adopted the German or Italian method, but failed to apply the same method to the consonant system. He was followed by Sir Charles Trevelyan, Volney, Monier Williams, M. Müller, and other English, French, and German scholars; but no generally satisfactory system was devised till 1853, when Prof. Lepsius of the university of Berlin published his "Standard Alphabet." This was adopted as a standard in 1854 by the church missionary society of England, and experience in the transcription of several African languages having proved its general availability, it has since been accepted by other missionary societies, by the American board of foreign missions, and by many linguists. In this alphabet are recognized only three primary vowels, *a*, *i*, and *u*, pronounced as in the German and Italian languages. Between these are ranged the various other vowel sounds of different languages, expanding them to 30 in all, including diphthongs. The consonants are divided into explosives, subdivided into *fortes*, *lenes*, and *nasales*, fricatives, subdivided into *fortes*, *lenes*, and *semivocales*, and liquids, 48 different sounds in all being recognized. To represent these 78 vocalic and consonantal sounds, Roman letters distinguished from each other by various diacritical marks are used in all but nine cases, in two of which the Arabic and Greek rough breathings are represented by their appropriate signs, and in the remaining seven Greek characters are employed. The alphabetic characters and their respective sounds are as follows, according to the edition of the "Standard Alphabet" of 1863:

VOWELS.

ā	Eng. father.
ă	Ger. Mann.
ē̱	Fr. mère.
ĕ̱	Eng. head.
ẹ̄	Eng. cane.
ī	Eng. see.
ĭ	Eng. sin.
ō̱	Eng. all.
ŏ̱	Eng. hot.
ọ̄	Eng. no.
ū	Eng. rule.
ŭ	Eng. foot.
ō̤̱	Fr. beurre.
ŏ̤̱	Eng. but.
ọ̤̄	Ger. König.
ụ̤̄	Fr. fûmes.
ụ̤̆	Fr. but.
ai	Eng. mine.
au	Eng. house.
aṳ	Ger. heute.
ei	Sp. reina.
oi	Eng. join.
ã	Fr. an, en.
ẽ	Fr. examen.
õ	Fr. on.
õ̤̱	Fr. un.
e̥	Eng. nation.
r̥	Sans. ऋ.
l̥	Sans. ऌ.
z̥	Chin. mandarin tsz̥.

CONSONANTS.

A. EXPLOSIVES.

a. Fortes.

ʿ	Arab. ع (ʿaïn).
k	Eng. cool.
ḱ	Old Sans. च.
č	Eng. ch.
ṭ	Sans. ट.
t	Eng. town.
p	Eng. pine.

b. Lenes.

ʼ	Heb. א, Gr. spiritus lenis.
q	Arab. ق (qaf).
g	Eng. gold.
ǵ	Old Sans. ज.
ǰ	Eng. j.
ḍ	Sans. ड.
ḏ (ṯ)	Arab. ط.
d	Eng. dear.
b	Eng. by.

c. Nasales.

ṅ	Eng. singing.
ń	Sans. ञ.
ṇ	Sans. ण.
n	Eng. no.
m	Eng. me.

B. FRICATIVES.

a. Fortes.

hʻ	Arab. ح (hʻa).
h	Eng. hand.
χ	Ger. Buch.
š	Eng. show.
χ́	Ger. ich.
ṣ̌	Old Sans. ष.
š́	Pol. świt.
s̱	Arab. ص (s̱ād).
s	Eng. sense.
θ	Eng. thin.
f	Eng. fine.

b. Lenes.

γ	Arab. غ (γaïn).
ž	Fr. jeune.
γ́	Mod. Gr. *γεφυρα.*
ž́	Pol. późno.

z	Fr. zèle.
ð	Eng. thy.
ð̱	Arab. ظ (ḏa).
ẕ	Arab. ض (ẕa).
	c. Semivocales.
y	Eng. year.
w	Eng. we.
	C. Liquids.
ṙ	Ger. and Fr. dialects.
ṛ	Sans. र.
r	Eng. very.
ĺ	Ital. gli.
ḷ	Sans. ळ.
l	Eng. low.

—See Toussaint and Tassin, *Nouveau traité de diplomatique* (6 vols. 4to, Paris, 1750–'65); T. Astle, "Origin and Progress of Writing" (London, 1784; new eds., 1803 and 1876); Jules Oppert, *Remarques sur les caractères distinctifs des différentes familles linguistiques* (8vo, Paris, 1860); Léon de Rosny, *Les écritures figuratives des différents peuples anciens et modernes* (Paris, 1860); H. Wuttke, *Geschichte der Schrift* (Berlin, 1872 *et seq.*); François Lenormant, *Essai sur la propagation de l'alphabet phénicien dans l'ancien monde* (new ed., Paris, 1875); and other authorities quoted in the article Manuscript.

WROTTESLEY, John, baron, an English astronomer, born at Wrottesley, Staffordshire, Aug. 5, 1798, died there, Oct. 27, 1867. He graduated at Oxford in 1819, and was called to the bar at Lincoln's Inn in 1823. He built observatories at Blackheath and Wrottesley, and in 1838 presented to the royal astronomical society a catalogue of the right ascensions of 1,318 stars, for which he received the gold medal of the society. He was chosen president of that society in 1841, and of the royal society in 1854. He succeeded his father in the peerage in 1841. He published "Thoughts on Government and Legislation" (London, 1859).

WROXETER, a village of Shropshire, England, on the Severn, 6 m. S. E. of Shrewsbury; pop. in 1871, 529. It is celebrated as the site of a Roman city, the Uriconium of Antoninus and the Viriconium of Ptolemy. The remains show that the city wall was 3 m. in circumference. In 1752 several Roman inscriptions, urns, and silver coins of Vespasian and later emperors were discovered. Since 1859 a systematic excavation has unearthed buildings, pottery, coins, ornaments, and other relics, and skeletons have been found in the hypocausts, showing that when the city was sacked and burned by the Saxons some of the inhabitants took refuge there. (See Wright, Thomas.)

WRYNECK (*yunx torquilla*, Linn.), a small bird of the woodpecker family, so called from its habit of turning the head in various directions; it has also been named snake bird for the same reason. It is about 7 in. long, of a rusty ash color, irregularly spotted and speckled with brown and black; the colors are prettily distributed, and the form is elegant. The bill is short, straight, and acute; the tongue extensile, ending in a simple horny tip; wings pointed, the first quill very short, and the third the longest; tail rounded, and its feathers soft; the two anterior toes joined together at their origin, and the two posterior unconnected. It is a summer visitor to Great Britain and N. Europe, spending the winter in N. Africa and the warm parts of W. Asia; it arrives in April and leaves early in September, so nearly at the same time with the cuckoo that it has been called the cuckoo's mate. Though having many of the habits of woodpeckers, it does not associate with them; the food consists principally of insects, and sometimes berries; it generally feeds on the ground; the eggs are 6 to 10, white, and laid in holes dug in trees.

Wryneck (Yunx torquilla).

WRYNECK (*torticollis*), a surgical disease, dependent generally on contraction of the muscles, in which the head and neck are turned sideways, forward, or backward, according to the muscles affected. In rare instances it may arise from disease or displacement of the cervical vertebræ, and may then be congenital; the distortion may be produced by the contraction of cicatrices after burns, and by tumors. The disease is almost always muscular in its seat; an uncommon form arises from paralysis of the muscles of the opposite side, which may be temporarily corrected without pain to the individual, and should be treated by electricity and the usual remedies employed for paralysis; it may also be rheumatismal, pain being increased or excited by motion, and that position being assumed in which the greatest ease is obtained. It is generally of short duration, and is to be treated like other muscular rheumatism. It is sometimes inflammatory or neuralgic; the former is occasionally noticed in weak children, and the latter in adults after tic douloureux; both are to be treated by rest, leeches, fomentations, and narcotic applications. The most usual form is the chronic wryneck caused by contraction of the sterno-mastoid muscles, in which the head is bent to one side (generally the right), and the face to the opposite, the right eyebrow and right corner of the mouth being elevated; the whole neck is distorted on the first dorsal vertebra in the direction opposite to that of the head and neck, requiring mechanical after the surgical treatment. Formerly this deformity was treated by tonics, various internal and external remedies (such as stimulating ointments and liniments), and mechanical contrivances; but, since Guérin (in 1838) first drew special attention to the subject, tenotomy or subcutaneous division of the tendons of the contracted muscles has been regarded as the remedy to be alone depended on. The usual operation is the division of the tendon of the sterno-mastoid muscle about half an inch above the sternal insertion, and is performed in a few seconds, without danger, pain, or loss of blood; it is sometimes necessary to divide the fibres of the *trapezius* and *platysma myoides* muscles.

WURMSER, Dagobert Sigismund, an Austrian soldier, born in Alsace of a distinguished family in 1724, died in Vienna, Aug. 22, 1797. He early entered the French service, but soon left it for that of Austria, and held commands in the seven years' war and the war of the Bavarian succession. In 1778 he became field marshal lieutenant, and in 1787 general of cavalry. On March 31, 1793, he led a *corps d'armée* across the Rhine against the French, and bore a considerable part in the succeeding operations. In 1796 he succeeded Beaulieu in Italy, who had been driven back by the French, and forced them to raise the siege of Mantua. But having divided his forces, he was defeated by Bonaparte at Castiglione (Aug. 5), Roveredo (Sept. 4), and Bassano (Sept. 8), and threw himself into Mantua, the blockade of which was resumed. His only hope was now from Alvinczy, and this was extinguished by that general's defeat at Rivoli, Jan. 14–15, 1797; and on Feb. 2 Wurmser was forced to surrender Mantua.

WÜRTEMBERG, or **Württemberg** (in English often WIRTEMBERG), a kingdom of the German empire, bounded N. E. and E. by Bavaria, S. by Bavaria, the lake of Constance, which separates it from Switzerland, the Prussian province of Hohenzollern, and Baden, and W. and N. W. by Baden. It lies between lat. 47° 35′ and 49° 36′ N., and lon. 8° 12′ and 10° 30′ E.; greatest length from N. to S. 140 m., greatest breadth from E. to W. nearly 100 m. It is divided into four circles, viz.:

CIRCLES.	Area, sq. miles.	Population in 1871.	CAPITALS.
Neckar	1,285	548,750	Ludwigsburg.
Black Forest	1,843	448,160	Reutlingen.
Danube	2,419	436,915	Ulm.
Jaxt	1,984	384,714	Ellwangen.
Total	7,531	1,818,539	

The population comprised 1,248,860 Protestants, 553,542 Roman Catholics, and 12,245 Jews. The capital is Stuttgart; the other principal towns, besides the capitals of the circles, are Tübingen, Heilbronn, Esslingen, Canstatt, and Friedrichshafen.—The Black Forest forms part of the western frontier. The Hornisgrinde, 3,855 ft., is the highest summit in Würtemberg. The Swabian Alps are almost entirely in this kingdom, entering it from Hohenzollern, and stretching about 80 m. N. E., with a breadth varying from 9 to 18 m. On the S. E. side they sink away in undulating hills; on the N. W. they are steep. They are not so high as the Black Forest, but bleaker. Their prevailing geological formation is limestone, while the characteristic rocks of the other range are sandstone and granite. The valleys between the mountains are very fruitful and picturesque. The Swabian Alps divide the kingdom into the basins of the Neckar on the northwest and of the Danube on the southeast. The Neckar, the principal river, rises E. of the Black Forest on the Baden frontier; its scenery is very fine, and it is navigable to Heilbronn for steamers. Its principal affluents are the Kocher and Jaxt, which join it on the right, and the Enz, from the left. The Danube crosses Würtemberg in a N. E. direction. The elevation of its surface above the sea level at Ulm, the head of steamboat navigation, is about 1,500 ft. Its largest tributary here is the Iller, which joins it on the right near Ulm, and forms part of the eastern boundary. There are many small ponds or lakes, but no large sheets of water except the lake of Constance, only a small part of which belongs to Würtemberg. The soil of the mountain regions is comparatively sterile, but affords abundant pasturage and valuable timber. In the valley of the Neckar and on the shore of the lake of Constance the climate is exceedingly mild. Only 4·8 per cent. of the area is unproductive. The arable and garden lands comprise 47·6 per cent.; meadows and pasturages, 17 per cent.; forests, 30·6 per cent. The chief products are grain, particularly spelt and barley, leguminous plants, hemp, flax, rapeseed, hops, tobacco, chiccory, poppy, fruits, sugar beets, wool, timber, salt, iron, and other minerals. There is but little coal. Würtemberg is chiefly an agricultural country, but the lake fisheries are considerable, and there are iron and steel works (some belonging to the government), breweries, and manufactories of linen, cotton, wool, silk, gold and silver ware, paper, musical instruments, particularly organs, beet sugar, and sparkling wine. The annual customs receipts are about 2,000,000 florins. The book trade is extensive, the publishers of Stuttgart ranking next to those of Leipsic and Berlin. Railways traverse the kingdom in all directions. Their aggregate length in June, 1875, was 773 m., all belonging to the state excepting one line of 7 m. The telegraph lines extended in 1873 over 1,434 m. The prosperity of Würtemberg has been greatly promoted by the large transit trade arising from railway traffic and the increased number of travellers. Emigration to the United States nevertheless continues; in 1872-'4 the annual average was 6,000.—Würtemberg is a constitutional monarchy, the present constitution bearing date Sept. 25, 1819. The crown is hereditary in the male line, and after its extinction in the female. The executive power is vested in the king, who exercises it through a privy council, consisting of the heads of the six ministerial departments and special councillors. The diet (*Ständeversammlung*), which meets every three years, or oftener if necessary, consists of two chambers. The upper chamber (*Kammer der Standesherren*) is composed of the princes of the royal family, the principal nobles, the representatives of domains which possessed a vote in the diet of the old German empire, and life members nominated by the king, not exceeding one third of the whole house. In 1874 the upper chamber had 45 members, of whom 9 were appointed for life. The second chamber (*Kammer der Abgeordneten*) in 1874 consisted of 13 chosen representatives of the nobility and landed proprietors, 7 of the large towns, 63 of small towns and rural districts, the 6 superintendents general of the Evangelical church, the Roman Catholic bishop and two other representatives of the Roman Catholic clergy, and the chancellor of the university of Tübingen; total, 93. Members of the upper chamber must be of age; those of the lower chamber must be 30 years old. The latter are chosen for six years. The king appoints the presidents of both chambers, in the upper chamber without restriction, and in the lower from among three members proposed by that body. When not in session the diet is represented by a committee of 12 members, consisting of the presidents of the two chambers, and two members of the upper and eight of the lower chamber. A court of state (*Staatsgerichtshof*), composed of a president and 12 members, six of whom are appointed by the king and six elected by the chambers conjointly, watches over the integrity of the constitution. In the federal council of Germany Würtemberg has four votes, and to the Reichstag it sends (1876) 17 deputies. Education is compulsory. The school age extends from the 6th to the 14th year, and there must be a public school in every community of 30 families. Illiteracy is almost unknown. After completing the course in the public school, those who do not enter a higher institution are bound to attend on Sundays the reviewing school (*Wiederholungsschule*). There are 8 gymnasia, 8 lyceums or other institutions having the rank of a gymnasium, 75 progymnasia and Latin schools, 73 *Realschulen*, 10 *Oberrealschulen*, and 523 agricultural, 314 drawing, and 1,441 industrial schools. The university of Tübingen and the polytechnic school of Stuttgart are celebrated institutions, especially the former. The Evangelical Protestant church was formed in 1823, by a union of the Lutheran and Reformed churches. At its head are six superintendents general, who bear the title of prelate. The territory is divided into 49 deaneries and 908 parishes, with 1,008 clergymen. The Roman Catholics have a bishop at Rottenburg, 655 parishes, and 914 priests. In 1875 there was only one Old Catholic congregation, with 102 members. The revenue for 1875–'6 was estimated at 24,440,736 florins, and the expenditures at 25,883,268. The deficit was covered by a surplus from former years. A balance of 4,771,079 florins remained on hand from the share of Würtemberg in the war indemnity of France, most of which is to be set aside for the exigencies of 1876–'7. The public debt in 1875 was $70,000,000, including about $53,000,000 for railways. The 13th army corps of the German empire consists of Würtemberg troops, including in times of war 62,898 men and 102 pieces of artillery.—Würtemberg was anciently included in Swabia. (See SWABIA.) The founder of the reigning dynasty was Ulric, count of Würtemberg (died in 1265), whose possessions only included the districts bordering on the Neckar and extending to the Black Forest. His successors Ulric II. and Eberhard made large additions to the county by conquest. In 1495 Eberhard V. was created duke of Würtemberg by the emperor Maximilian at the diet of Worms. Protestantism was introduced about 1540 under Ulric VI., who had been expelled by the Swabian league of free cities, but restored by his son Christopher. (See CHRISTOPHER.) The latter more firmly established the new faith. During the wars of the French revolution the country was at different times the theatre of conflict between the contending armies, and in 1801 the last duke of Würtemberg, Frederick II., was obliged to cede Montbéliard to France. For this he received an extension of territory, including several imperial cities. He was also created an elector of the empire in 1803. Three years later he assumed the title of king of Würtemberg as Frederick I. (see FREDERICK I., vol. vii., p. 463), joining the Rhenish confederation under the protectorate of Napoleon, and established a uniform system of government and perfect religious equality throughout the kingdom. After the battle of Leipsic in 1813, Frederick joined the allies against Napoleon. He died in 1816, and was succeeded by William I., who died in 1864. (See WILLIAM I., vol. xvi., p. 634.) The present king is Charles I., born in 1823. In 1849, during which year Stuttgart was for a short time the seat of the German rump parliament (see GERMANY, vol. vii., p. 755), the constitution was liberalized. After the victory of Prussia over Austria in 1866, Würtemberg, which had sided with the latter, allied itself with the victorious power by a special military treaty. In February, 1867, military conferences were held in Stuttgart to promote a greater conformity of the army organization of the South German states with that of Prussia. During the period preceding the French war, Würtemberg as well as Bavaria was unwilling to make any further concessions on the question of union; but the outbreak of the war finally settled that question. On Nov. 25, 1870, Würtemberg signed the treaty concluded between the North German confederation, Baden, and Hesse, concerning the establishment of a German confederation. It took a conspicuous part in the war, and toward the close of the same year assented to the proposition of the king of Bavaria to make the king of Prussia emperor of Germany. The relations between Würtemberg and the empire have continued friendly, although an opposition is springing up (1876) against the scheme of placing the Würtemberg and other state railways under the control of the empire.

WURTZ, Charles Adolphe, a French chemist, born in Strasburg, Nov. 26, 1817. He became chief of the chemical department in the medical faculty at Strasburg in 1839, and took his degree there in 1843. Subsequently he was connected with institutions at Paris and Versailles. After the death of Orfila in 1853 and the retirement of Dumas in 1854, their chairs were united in that of medical chemistry, and given to Wurtz. In 1856 he became a member of the medical academy, in 1866 dean of the faculty of medicine, and in 1867 of the academy of sciences, at whose suggestion the biennial prize of 20,000 francs had been awarded to him in 1865. He began in 1842 to write for the *Annales de chimie et physique*, and since 1858 he has edited the *Répertoire de chimie pure.* On Dec. 3, 1875, he submitted to the French academy the first specimen of gallium, a new metal discovered by Lecoq de Boisbaudran. His works include *Traité élémentaire de chimie médicale* (3 vols., Paris, 1864–'5); *Leçons élémentaires de chimie moderne* (1866–'8); *Dictionnaire de chimie pure et appliquée* (1868 *et seq.*), with an introduction published separately under the title of *Histoire des doctrines chimiques* (1868); and *Les hautes études pratiques dans les universités allemandes* (1870). Among English translations of his works are: "Chemical Philosophy according to Modern Theories" (London, 1867), and "Theory from the Age of Lavoisier" (1869).

WÜRZBURG, a city of Bavaria, capital of Lower Franconia, on the right bank of the Main, which is navigable here and spanned by a large stone bridge with statues of saints, 140 m. N. W. of Munich; pop. in 1875, 40,005, all Catholics excepting about 5,000 Protestants and 1,100 Jews. It is irregularly built, but has fine streets and promenades. It has a magnificent episcopal palace with a garden, rebuilt in 1720–'44. The principal churches are the cathedral, rebuilt in the 11th century, containing the Schönborn chapel and monuments of bishops; the Marienkapelle, with remarkable specimens of early German art; and the Stifthaug, built after St. Peter's, with an imposing cupola. The university was founded in 1403 by Bishop Johann von Eglofstein, but was closed after his death, and restored in 1582 by the prince-bishop Julius. The institution received a great impulse through the prince-bishop Franz Ludwig von Erthal (died in 1795), but declined after 1805, on the cession of the see of Würzburg to the former grand duke Ferdinand of Tuscany, and did not revive until the restoration of Bavarian rule in 1815. It has ever since held a foremost rank, especially in medicine. The Julius hospital embraces the lecture rooms, anatomical theatre, botanic garden, and chemical laboratory, and close by are the lying-in and epileptic hospitals. In 1875 the university had 58 professors and several other teachers, and was attended by 960 students, chiefly in medicine, excepting 200 in philosophy and 130 in theology, including many foreigners. The university library has 100,000 volumes and 1,500 manuscripts. The other institutions include a gymnasium, theological seminary, and various schools and charitable asylums. The prosperity of the city has lately much increased, and it is in a fair way of becoming a centre of trade for southern Germany, especially in wine and fruit. The principal manufactures are sparkling wines, leather, tobacco, wool, and railway carriages. —Würzburg dates from the 6th century. In the 7th it became the capital of a part of Franconia. St. Kilian is said to have preached the gospel here in 688. St. Boniface about 741 installed Burkhardt as the first of the bishops, who were ultimately raised to the rank of prince-bishops, and after 1120 they were known for a time as dukes of Franconia. In the 18th century their territory had a population of 250,000. The treaty of Lunéville (1801) secularized the see, and most of it was incorporated in 1803 with Bavaria. In 1805 it was by the treaty of Presburg allotted to the former grand duke Ferdinand III. of Tuscany, and raised to an electoral principality. In 1806 it became a grand duchy; but in 1814–'15, when Ferdinand was reinstated in Tuscany, Würzburg was restored to Bavaria. The opposite fortress of Marienberg was bombarded in July, 1866, by the Prussians under Gen. Goeben; and shortly after the army of the Main occupied Würzburg and the adjoining territory. The fortifications of the city were razed, but those of Marienberg were restored as barracks and a state prison, which during the war of 1870–'71 contained over 7,000 French prisoners.

WUTTKE, Heinrich, a German historian, born in Brieg, Silesia, Feb. 12, 1818, died June 14, 1876. He studied in Breslau, and in 1841 became a private lecturer and in 1848 professor of history at the university of Leipsic. In the latter year he was elected to the Frankfort parliament, and succeeded Blum in the national assembly, where he was one of the founders of the "Great German" party. His works include *Polen und Deutsche* (Leipsic, 1847); *Erdkunde und Karten des Mittelalters* (1854); *Die Völkerschlacht bei Leipzig* (Berlin, 1863); *Ueber die Gewissheit der Geschichte* (1865); and *Geschichte der Schrift* (1872 *et seq.*).

WYANDOT, a N. W. county of Ohio, intersected by the Sandusky river; area, 350 sq. m.; pop. in 1870, 18,553. The surface is level and diversified by prairie and woodland, and the soil is fertile. It is traversed by the Pittsburgh, Fort Wayne, and Chicago, the Cincinnati, Sandusky, and Cleveland, and the Findlay branch railroads. The chief productions in 1870 were 388,036 bushels of wheat, 451,887 of Indian corn, 178,712 of oats, 50,308 of potatoes, 348,142 lbs. of butter, 311,964 of wool, and 23,403 tons of hay. There were 5,328 horses, 4,422 milch cows, 6,581 other cattle, 77,902 sheep, and 15,451 swine; 10 manufactories of carriages and wagons, 6 of furniture, 2 of iron castings, 1 of machinery, 2 flour mills, 16 saw mills, and 3 woollen mills. Capital, Upper Sandusky.

WYANDOTS, an Indian tribe, of the Iroquois family, in the United States, known for the last century by this name, but previously calling themselves Tionontates or Dinondadies. They were originally on the shores of Lake Huron, about 40 m. S. W. of the Wendats or Hurons proper. They cultivated and traded in tobacco so extensively that the early French called them the Petun or Tobacco Indians. After the defeat of the Hurons, they too were attacked and nearly destroyed by the Iroquois. The survivors, with a few fugitive Hurons, fled to Black river, Wisconsin, and wandered to Lake Superior. In 1670 they were compelled by a war with the Sioux to betake themselves to Michilimackinac, whither they were accompanied by Father Marquette. Their next removal was to Detroit, whence they extended their hunting grounds S. to Sandusky. Here about 1740 a reformatory mission was begun by the Jesuits, and in time nearly the whole tribe removed to the spot and took a prominent part in all our early Indian affairs in the west. In 1778 this part of the tribe was estimated to contain 180 men able to bear arms. In the war of 1812 it furnished 100 warriors to the English forces. In 1829 a band of about 40 was living on the river Huron W. of Lake Erie, in Michigan; but the principal portion of the Wyandots, estimated at 600 souls, was collected on the head waters of the Sandusky river. By a treaty of April 6, 1832, they sold their lands in Ohio to the United States government, and were removed, numbering 687, to the junction of the Kansas and Missouri rivers, in the present state of Kansas, where they still remain. In 1836 a census showed their number to be 575, and in 1847, to be 687, in 117 families. By a treaty of Jan. 31, 1855, they acquired the right to become citizens, and the lands of the tribe were divided among them, giving to each person the ownership of about 40 acres. A band of 239 was still in 1875 on the Quapaw reservation. A small portion of the Wyandots remained near Detroit, and by a treaty made there in 1790 the English government assigned to them the Huron reserve of 23,620 acres on Detroit river, where they still remain, their numbers having declined in this century from 200 to 72. The *sasteretsi* or hereditary king, with the national wampum, remained with this band.

WYANDOTTE, a N. E. county of Kansas, separated from Missouri on the northeast by the Missouri river, and intersected in the S. part by the Kansas; area, 155 sq. m.; pop. in 1870, 10,015; in 1875, 12,363. It is traversed by the Kansas Pacific and Missouri Pacific railroads. It is well timbered, and has a fertile soil. The chief productions in 1870 were 18,695 bushels of wheat, 233,905 of Indian corn, 24,129 of oats, 52,339 of potatoes, 40,865 lbs. of butter, and 1,589 tons of hay; 1 railroad repair shop, 3 flour mills, and 6 saw mills. Capital, Wyandotte.

WYANDOTTE, a city of Wayne co., Michigan, on the Detroit river, 12 m. below Detroit; pop. in 1870, 2,731; in 1874, 3,338. It has railroad communication by means of the Lake Shore and Michigan and the Canada Southern lines. It contains two blast furnaces, extensive rolling mills, stove works, a ship yard for the construction of iron vessels, extensive silver smelting and refining works, a saw mill, and a planing mill. There are a savings bank, two union schools, a weekly newspaper, and six churches (Episcopal, Methodist, Presbyterian, and Roman Catholic). It was incorporated in 1867.

WYANDOTTE CAVE, a remarkable natural curiosity in Crawford co., Indiana, 4 m. from Leavenworth. It is 22 m. in extent, with a maximum width of 300 ft. and a height of 245 ft. The cave is dry, and contains a few narrow passages, but for the most part the galleries are broad and high, and frequently expand into great rooms. The interior presents a wealth of crystalline ornamentations, said to exceed in extent and beauty those of the Mammoth cave. The two most extensive rooms are called Mammoth hall and the Senate chamber. The former is 350 ft. long and 245 ft. high, and contains Monument mountain, 175 ft. high, on the top of which stand three great stalagmites. One of these, called Lot's wife, is pure white, and has the appearance of being draped. Wallace's grand dome rises 70 ft. above the mountain summit, or 245 ft. from the floor of the cave. In the Senate chamber is the Pillar of the Constitution, formed by a stalacto-stalagmitic deposit about 25 ft. in diameter and 30 ft. high, reaching from the top of a great stalagmite hill to the ceiling. Other points of interest are the White Cloud room, with its wave-like walls and ceiling coated with glistening crystals, like a frosting of snow; the Island of Confusion, and Purgatory, where the rocks have the same rich coating; Pillared Palace, with its innumerable stalactites arranged in rich clusters; Beauty's Bower, where the walls are covered with gypsum rosettes as white as snow; the "snow banks," formed by myriads of fine loose crystals of alabaster; and the gallery, where the floor glistens with acicular crystals of gypsum. In other rooms the stones are covered with fine hair-like crystals of Epsom salts from one to two inches long.

WYATT, James, an English architect, born in Staffordshire, Aug. 3, 1746, accidentally killed near Marlborough, Sept. 5, 1813. He studied architecture in Rome and Venice, brought himself into notice by his designs for the Pantheon, in Oxford street, London, for many years a fashionable rendezvous, and received commissions for private residences in all parts of the kingdom. He was one of the first to attempt the revival of Gothic architecture, and for many years he was unrivalled as the restorer of ancient English architecture. His most famous work in this style was Fonthill abbey, erected for Beckford. He was surveyor general subsequent to 1796, and in 1802-'3 was president of the royal academy.—His nephew, Sir JEFFREY WYATVILLE (born in Burton-on-Trent, Aug. 3, 1766, died in Windsor, Feb. 18, 1840), designed and superintended the alterations in Windsor castle, commenced in 1824. His name was changed from Wyatt on his being knighted in 1828.

WYATT, Sir **Matthew Digby,** an English architect, born in Wiltshire in 1820, died May 21, 1877. He studied at the royal academy and on the continent, and published "Specimens of the Geometrical Mosaics of the Middle Ages" (1848), and in connection with it a "Historical Notice of the Art." In 1849 the society of arts commissioned him to report upon the exposition held that year in Paris; and in 1851 he superintended the erection of the crystal palace in London. He was next associated with Brunel in designing the Paddington station of the Great Western railway, and between 1852 and 1854 he superintended the fine art department and decorations of the crystal palace at Sydenham. He was appointed surveyor to the East India company in 1856, and executed many important designs for public works in Great Britain and India, including several great bridges. In 1869 he was knighted, and was appointed Slade professor of fine arts at Cambridge. His most important publications are: "The Industrial Arts of the XIXth Century" (2 vols., with 160 plates), written in connection with his labors at the international exhibition of 1851; "Metal Work and its Artistic Designs" (fol., 1852); "Essay on Ivory Carving" (1856), published with photographs in a small folio by the Arundel society; "Art Treasures of the United Kingdom" (1857); "What Illuminating was," and "What Illuminating should be, and how it may be practised" (1861); "Fine Art" (1870); and "An Architect's Note Book in Spain" (1872).

WYATT, Richard James, an English sculptor, born in London, May 3, 1795, died in Rome, May 29, 1850. He studied under Canova in Rome, where he resided after 1821. His most noticeable productions are his "Nymph entering the Bath" and "Nymph leaving the Bath," "Shepherdess with a Kid," "Musidora," "Penelope," and the groups "Eucharis and Cupid," "Ino and Bacchus," and "Huntress with a Leveret and Greyhound." He also executed excellent portrait busts and rilievi. At the great exhibition of 1851 the medal for sculpture was awarded him posthumously.

WYATT. I. Sir **Thomas,** an English poet, born at Allington castle, Kent, in 1503, died at Sherborne, Oct. 11, 1542. He graduated at Cambridge in 1518, became a gentleman of the bedchamber to Henry VIII. in 1525, officiated as ewerer at Anne Boleyn's marriage in 1533, was knighted March 18, 1536, and became high sheriff of Kent in 1537. He was sent to Spain as ambassador to Charles V. in April, 1537, and was again employed at the court of that emperor, now in the Low Countries, from November, 1539, till May, 1540, after which he lived mostly in retirement in England. His poems have usually been published with those of the earl of Surrey. (See SURREY.) **II.** Sir **Thomas,** commonly called the younger, an English soldier, son of the preceding, born in Kent about 1520, beheaded on Tower hill, April 11, 1554. From 1545 to 1550 he commanded at Boulogne, and in 1554 led the Kentish insurgents in the duke of Suffolk's conspiracy on occasion of the proposed marriage of Queen Mary with Philip II., entered London at the head of his followers, and after a fight in the streets was captured, Feb. 7. This foolhardy movement, commonly called Wyatt's rebellion, caused the immediate execution of Lady Jane Grey.

WYCH HAZEL. See WITCH HAZEL.

WYCHERLY, William, an English dramatist, born at Clive, near Shrewsbury, about 1640, died in London about the end of December, 1715. He was sent to France for his education, and frequented the residence of the duke de Montausier, governor of Angoulême, where he was converted to the Roman Catholic faith. He afterward studied at Oxford and was reconverted; but Pope, whom in his old age he employed to correct his verses, says he died a Catholic. In 1672 he produced with great success his first play, "Love in a Wood, or St. James's Park," composed according to his own account when he was but 19 years of age. The duchess of Cleveland, the king's mistress, introduced him at court. The duke of Buckingham took him into his service, the king subsidized him liberally, and he became one of the most noted wits and gallants of the time. During this period he produced his three remaining plays, "The Gentleman Dancing-Master," "The Country Wife," and "The Plain Dealer," all of which were received with great favor, but are too licentious for modern representation. About 1680 Wycherly married the dowager countess of Drogheda, who soon died, leaving him her whole fortune; but the settlement was contested, and a long litigation left him bankrupt and in prison. James II. released him and settled upon him a pension of £200. The death of his father at length left to him the family estates. In 1704 he published a folio volume of "Miscellany Poems," remarkable chiefly for bad rhymes and worse morality. Eleven days before his death he married again, chiefly to annoy and burden his heir-at-law, a nephew whom he hated. A volume of his works, comprising poems and "moral reflections," was published in 1728. The latest edition of his plays is in a volume with the dramatic works of Congreve, Farquhar, and Vanbrugh, with biographical notices by Leigh Hunt (1840).

WYCLIFFE, Wickliffe, or Wiclif, John de, an English reformer, born probably in a village which bears his name, near Richmond, Yorkshire, about 1324, died at Lutterworth, Dec. 31, 1384. He was educated at Queen's and Merton colleges, Oxford. The earliest publication attributed to him, though on slight evidence, is a tract entitled "The Last Age of the Church" (1356), first printed under the editorial care of J. H. Todd, D. D. (Dublin, 1840). The "black death" had recently desolated Europe, and the design of this tract was to prove that the day of judgment was impending. In a controversy with the mendicant orders about 1360, he upheld the authority of the parochial clergy against the friars. About the same time he became master of Balliol college, Oxford, and was preferred to the living of Fillingham. In 1365 he exchanged his office for the wardenship of Canterbury hall, under a new arrangement by which monks were excluded from it. The monks protested, its founder Archbishop Simon de Islip soon died, and his successor pronounced Wycliffe's appointment void. He in turn protested, but after a litigation of seven years both the pope and the king decided against him. While this suit was pending, Pope Urban V. demanded the annual tribute promised by King John as an acknowledgment of the pontiff's feudal superiority. Wycliffe, now a royal chaplain, declared against the papal claim. In 1368 he exchanged the living of Fillingham for that of Ludgershall, which was nearer to Oxford. In 1372 he took the degree of doctor of theology, and, availing himself of the right then conferred by that title, began to lecture in the university as a professor of theology, frequently assailing the corruptions of the begging friars. Two years later he was one of an embassy sent by Edward III. to negotiate at Bruges with the delegates of Gregory XI., chiefly concerning the papal reservation of benefices in England, which, being held by foreigners, diverted the revenues to Rome or Avignon. During an absence of nearly two years he was presented by the king to the prebend of Aust, in the collegiate church of Westbury, and to the rectory of Lutterworth. The part which he took in the embassy made him obnoxious to the pope, who in 1377 sent letters to Oxford and Canterbury, the bishop of London, and the king, demanding inquiry concerning the doctrines imputed to him, and that he should be immediately put in custody until further instructions. Wycliffe had already been summoned on a charge of heresy before the English convocation in St. Paul's, Feb. 19. When he made his appearance, it was with John of Gaunt, duke of Lancaster, on one side, and Lord Percy, earl marshal of England, on the other. Between these noblemen and Courtney, bishop of London, the presiding churchman, a violent altercation at once ensued; the throng broke into tumult; the meeting was dissolved, and the reformer withdrew under the protection of his powerful friends. The populace favored the clergy, and attacked the magnificent palace of John of Gaunt, the Savoy, which was saved by the influence of the bishop of London. At the request of parliament Wycliffe drew up a paper against the right of the pope to divert the ecclesiastical revenues abroad. The papal bull was treated by the university with cold respect; but early in 1378, in obedience to a summons of the archbishop of Canterbury, Wycliffe appeared before a synod of the clergy in Lambeth. The populace were now disposed to take his part, and a messenger also arrived prohibiting the synod in the name of the queen mother from proceeding to any conclusions injurious to him. He was released with an admonition, and resumed his pulpit discourses, academic lectures, and various writings, his opinions becoming more and more adverse to those upheld by the clergy. The most important of his writings was an English version of the whole Bible from the Latin Vulgate, finished about 1383, in which he was probably assisted by pupils and learned friends, and of which he multiplied copies by the help of transcribers. Editions of his New Testament were printed by Lewis in 1731, by Baber in 1810, and in Bagster's "English Hexapla" in 1841. The complete translation was first published by the university of Oxford, under the editorial care of the Rev. Josiah Forshall and Sir Frederick Madden (4 vols., 1850). Wycliffe's disciples, under the name of poor priests, disseminated his doctrines by open-air preaching. In 1381 he took his boldest step and gave the greatest offence by lecturing at Oxford against the doctrine of transubstantiation. The chancellor summoned an assembly of twelve doctors, who condemned his conclusions; Courtney, who had been raised to the see of Canterbury, called another synod, which declared ten opinions that had been publicly preached to be heretical, and enjoined the most vigorous measures for their suppression; and the crown, on petition of the lords spiritual in parliament, empowered the sheriffs of counties to arrest all preachers of heresy. Wycliffe remained unmolested till 1382, when an appeal which he addressed to the king and parliament caused him to be summoned before the convocation of the clergy at Oxford. He appeared, and gave two confessions or defences, one in Latin and one in English, in which he maintained a real presence while denying transmutation. No sentence was pronounced, but a letter was obtained from the king which debarred him from teaching in the university. He spent his later life at Lutterworth, where he continued to preach and write constantly. The council of Constance, May 5, 1415, after condemning 45 articles which he had maintained, ordered his bones to be taken from consecrated ground and cast upon a dunghill. But this was not done till the antipope Clement VIII., in 1428, ordered the sentence to be strictly executed, when his remains were burned and the ashes cast into the Swift, a branch of the Avon.—Wycliffe maintained that the authority of the crown was supreme over all persons and property in England. He was opposed to the whole framework of the hierarchy as a device of clerical ambition, and to episcopacy and endowments, and held that the clergy should be supported by alms, and should require only livelihood and clothing. He retained the ordinance of baptism, but without regarding it as essential to salvation, and the sacrament of the mass, but without the doctrine of transubstantiation. He denied any intrinsic beneficial influence from confirmation, penance, holy orders, or extreme unction, and declared them all fraught with delusion. He believed in the existence of an intermediate state, but held masses for the dead to be a piece of clerical machinery, adjusted with a view to gain. He taught that men are neither the better nor worse for church censures, but that the destiny of each is determined according to his own spiritual condition as a responsible creature. The number of brief tracts which he produced baffles calculation; 200 are said to have been burned in Bohemia; many of them still exist in manuscript. The "Select English Works of John Wyclif" have been edited from original manuscripts by T. Arnold (3 vols. 8vo, London, 1871). His life has been written by the Rev John Lewis (1719), Dr. Robert Vaughan (1828; revised, 1853), and the Rev. Webb Le Bas (1832). See also "John de Wycliffe, D.D., a Monograph," by Robert Vaughan, D.D. (London, 1853), and Lechler's *Johann von Wiclif und die Vorgeschichte der Reformation* (Leipsic, 1873).

WYKEHAM, William of. See WILLIAM OF WYKEHAM.

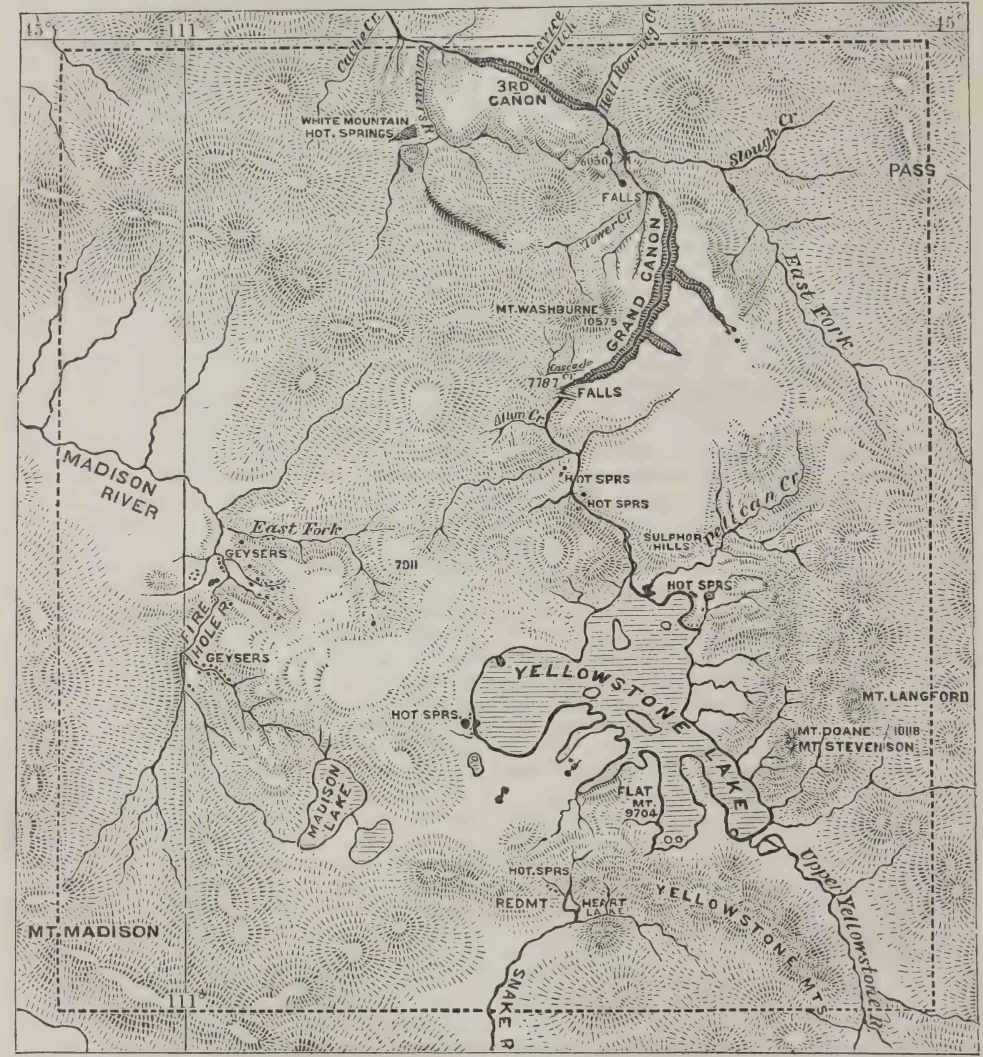
WYLIE, Andrew, an American educator, born in Washington co., Pa., April 12, 1789, died in Bloomington, Ind., Nov. 11, 1851. He graduated at Jefferson college in 1810, became its president in 1812, and was licensed as a preacher in the Presbyterian church. In 1817 he was chosen president of Washington college, and from 1829 till his death he was president of the university of Indiana. In 1841 he was ordained a deacon in the Protestant Episcopal church, and in 1842 a priest. His publications consist of an "English Grammar" (1822), "Sectarianism is Heresy" (1840), and numerous occasional addresses.

WYMAN, Jeffries, an American comparative anatomist, born in Chelmsford, Mass., Aug. 11, 1814, died in Bethlehem, N. H., Sept. 4, 1874. His father, Rufus Wyman, was the first physician of the McLean asylum for the insane. Jeffries graduated at Harvard college in 1833, received the degree of M. D. in 1837, and became demonstrator to the professor of anatomy, Dr. John Collins Warner. In 1839 he was appointed curator of the Lowell institute, Boston, and in 1840 was selected to deliver a course of lectures for it. He then studied in Europe, and in 1843 became professor of anatomy and physiology in the medical department of Hampden Sidney college, Richmond, Va. In 1847 he accepted the chair of anatomy in Harvard university, and began the formation of the museum of comparative anatomy, to which he devoted a large part of his life. For this work he travelled extensively, and his collections rapidly outgrew all the accommodations provided for them. On the foundation of the archæological museum by George Peabody in 1866, Prof. Wyman was appointed curator. He was secretary of the Boston society of natural history, its curator successively in different departments, and its president from 1856 to 1870. In 1857 he was chosen president of the American association for the advancement of science. His two collections, that of comparative anatomy and that of archæology, are monumental. His experiments on the development of infusoria in infusions of organic matter, after long continued boiling in sealed vessels, are among the most thorough and satisfactory which have been made on this crucial subject. His observations on the development of mould in the interior of eggs bear on the same disputed question. He made visible at a distance, and even measured, the force of ciliary motion, by an exquisitely contrived little apparatus of his own invention. He studied the effect of light on the development of batrachian larvæ, and illustrated the action of a quasi-polar force in the formation of a double-headed fœtus and similar monstrosities, and in the differentiation and disposition of the embryonic elements generally, in the most striking manner, by the action of bar magnets on iron filings. In comparative anatomy his knowledge was first made known to the public by his exposure of the factitious character of the composite fabric exhibited as the skeleton of an extinct sea serpent, under the name of *hydrarchus Tillimani.* In the catalogue of scientific papers compiled and published by the royal society of London is a list of 64 articles by Prof. Wyman, and a mention of four others bearing his name in conjunction with those of Prof. Hall, Prof. Horsford, and Dr. Savage. Among his most important published papers are the following: "Observations on Crania;" "Report on the Examination of the Skeleton of a Hottentot;" "Arrangement of the Spicula of Cancellated Structure in the Neck of the Femur and other Bones;" "Description of the Brain and Cranial Cavity of Daniel Webster;" "Account of a hitherto unnoticed Fracture of the two lower Lumbar Vertebræ;" "Evidence in a Murder Trial on the Changes of Bones subjected to great Heat;" "On the Nervous System of Rana Pipiens;" "On the Embryology of Raia Batis;" and his description of the gorilla. His pamphlet entitled "Notes on the Cells of the Bee" is a model of accurate, patient, ingenious research, leading to conclusions quite different from those of noted observers who had gone before him. His most recent papers relate to archæological subjects, the last one (read at a meeting of the society of natural history, May 20, 1874) being on the discovery of human remains in the fresh-water shell heaps of Florida.

WYNDHAM, Sir **William,** a British statesman, born at Orchard-Wyndham, Somersetshire, in 1687, died in Wells, July 17, 1740. He was educated at Oxford, and entered the house of commons for his native county. He identified himself with the tories, and was secretary at war in the Oxford and Bolingbroke ministry in 1711–'13, and chancellor of the exchequer in 1713–'14. In the quarrel between Oxford and Bolingbroke he took the part of the latter, and was suspected of treasonable relations with the pretender. On the outbreak of the rebellion in Scotland under the earl of Mar in 1715, he was arrested at his house in Somersetshire, but escaped. A reward of £1,000 was offered for his apprehension, and after lurking for some time in disguise he surrendered himself and was committed to the tower. He was finally released without a trial, but remained until his death a leader of the parliamentary opposition to the ministry of Sir Robert Walpole.—His son, Sir CHARLES WYNDHAM, who inherited from his mother's brother, the duke of Somerset, the title of earl of Egremont, was chosen by Fox and Waldegrave to be secretary of state after the dismissal of Pitt by George II. in 1757; but the return of Pitt to office frustrated the arrangement. Egremont however received the place on Pitt's final resignation, Oct. 5, 1761. He died in 1763.

WYNKIN DE WORDE. See WORDE.

WYOMING, a territory of the United States, situated between lat. 41° and 45° N., and lon. 104° and 111° W., forming nearly a perfect quadrangle; length E. and W. about 350 m., breadth about 275 m.; area, 97,883 sq. m. It is bounded N. by Montana, E. by Dakota and Nebraska, S. by Colorado and Utah, and W. by Utah, Idaho, and Montana. It is divided into seven counties, viz.: Albany, Carbon, Crook, Laramie, Pease, Sweetwater, and Uintah. The principal places, all of which are small, are Cheyenne, the capital, in Laramie co.; Laramie City and Sherman, Albany co.; Rawlins and Carbon, Carbon co.; South Pass City, Rock Springs, Green River City, and Atlantic City, Sweetwater co.; and Evanston, Uintah co.; all, except South Pass City and Atlantic City, on the Union Pacific railroad. The population in 1870 was 9,118, including 183 colored persons, 143 Chinese, and 66 non-tribal Indians; in 1875, estimated by the governor at 24,000. Of the inhabitants in 1870, 5,605 were native and 3,513 foreign born, 7,219 males and 1,899 females. Of the natives, 293 were born in the territory, 985 in New York, 627 in Pennsylvania, 547 in Ohio, 404 in Illinois, and 319 in Missouri. Of the foreigners, 1,976 were natives of the British isles, including 1,102 Irish, and 652 of Germany. There were 449 males and 407 females between 5 and 18 years of age, 6,056 males from 18 to 45, and 6,107 males 21 years old and upward. The number of families was 2,248, with an average of 4·06 persons to each; of dwellings, 2,379, with an average of 3·83 to each. Of persons 10 years old and upward, 468 could not read and 602 could not write; 6,645 were returned as engaged in all occupations, of whom 165 were employed in agriculture, 3,170 in professional and personal services, 1,646 in trade and transportation, and 1,664 in manufactures and mining. There are about 1,800 Shoshone Indians occupying a reservation of 1,520,000 acres in the W. part of the territory, who maintain tribal relations.—The surface of Wyoming is high and mountainous, the mean elevation being 6,450 ft. The main chain of the Rocky mountains extends across it S. E. and N. W., entering from Colorado W. of the 105th meridian and passing out at the N. W. corner. Much the larger part of the territory lies N. E. of the "divide." The principal ranges are the Wind River mountains, in the N. W.; the Big Horn mountains, N. of the centre; the Black hills in the N. E.; the Laramie mountains S. W. of these, and still further S. the Medicine Bow mountains, on the Colorado border; the Bishop mountains, W. of the main chain and also on the border; and the Rattlesnake hills and Sweetwater mountains, in the central portion of the territory, the former N. and the latter on both sides of the Sweetwater river. Fremont's peak, the loftiest summit of the Wind River mountains, about lat. 43° 15′, lon. 110°, is 13,570 ft. high. The Laramie mountains form the E. boundary of the Laramie plains. Laramie peak is about 10,000 ft. high. The Laramie plains have a length N. W. and S. E. of 90 m. and an average breadth of 75 m., comprising an area of nearly 7,000 sq. m., with an average elevation of 7,000 ft. They are bounded N. W. by the Rattlesnake hills and S. by the Medicine Bow mountains, and are drained chiefly by the Laramie and Medicine Bow rivers. The surface varies in character and elevation, some portions consisting of beautiful meadow expanses, while others are rolling and hilly, with little vegetation. The Black hills (partly belonging to Wyoming and partly to Dakota) lie between the N. and S. forks of the Cheyenne river, a tributary of the Missouri, chiefly in Dakota, and between the 43d and 45th parallels and the 103d and 105th meridians, extending N. and S. about 100 m., with a breadth of from 40 to 60 m. The base has an elevation of from 2,500 to 3,000 ft., while the peaks rise to a height of from 6,000 to 7,000 ft. A greater quantity of rain falls here than in the surrounding plains, and the hills are well wooded, chiefly with pine. Valuable pastures exist, and there is considerable arable land. Gold has recently been discovered. Unsuccessful attempts have been made to extinguish the Indian title to the Black hills, but large numbers of miners are now (1876) flocking thither. —The S. W. portion of the territory is drained by the Green river, the chief constituent of the Colorado of the West; a small area on the N. W. border by the Snake; and the rest by tributaries of the Missouri. The Big Horn (called in its upper course Wind river), Tongue, and Powder rivers, in order from the west, flow N. and join the Yellowstone in Montana. The Big Horn and Powder have important tributaries. In the N. E. corner is the Little Missouri, which flows N. E. through the S. E. corner of Montana, and joins the Missouri in Dakota. Further S. are the forks of the Cheyenne, which have an E. course into Dakota. S. of these is the North Platte, which rises in the North park in Colorado, flows N., and in Wyoming receives the Medicine Bow river from the east and the Sweetwater (rising in the Wind River mountains) from the west, and then (S. of the centre of the territory) bends to the east and southeast and enters Nebraska. Near the Nebraska boundary it receives the Laramie river with its tributary, Chugwater creek, from the south, and Rawhide creek from the north. In the southeast are some streams that join the South Platte in Colorado.—In the N. W. corner of the territory is a tract more remarkable for natural curiosities than an equal area in any other portion of the globe, which might properly be called the "Northern Wonderland," in contradistinction to a similar region in New Zealand known as the "Southern Wonderland." It was first definitely brought to notice



Map of the Yellowstone National Park.

by a party of surveyors from Helena, Montana, in 1869. In 1870 an expedition under the direction of the surveyor general of that territory visited the region, and in 1871 Prof. Hayden at the head of a scientific corps made a careful exploration of its most remarkable features. His report induced congress to pass an act, approved March 1, 1872, by which the district, now known as the Yellowstone national park, was "reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart as a public park or pleasuring ground for the benefit and enjoyment of the people," and was placed under the exclusive control of the secretary of the interior. The park lies mostly between lat. 44° and 45° and lon. 110° and 111°, extending on the west into Montana. It is 65 m. N. and S. by 55 m. E. and W., comprising 3,575 sq. m., and is all more than 6,000 ft. high. Yellowstone lake (22 by 15 m. in extent) has an altitude of 7,788 ft. The mountain ranges that hem in the valleys on every side rise to the height of 10,000 and 12,000 ft., and are covered with perpetual snow. During June, July, and August the atmosphere is pure and very invigorating, with scarcely any rain, and storms of any kind are rare; but the thermometer frequently falls as low as 25°, and there is frost every month of the year. The entire region was at a comparatively modern geological period the scene of remarkable volcanic activity. The most striking features of the park are its geysers, hot springs, waterfalls, and cañons. In the number and magnitude of its hot springs and geysers it surpasses all the rest of the world. There are probably 50 geysers that throw a column of water to a height of from 50 to 200 ft., and from 5,000 to 10,000 springs, chiefly of two kinds, those depositing lime and those depositing silica. There is every variety of beautiful color, and the deposits form around their borders the most elaborate ornamentation. The temperature of the calcareous springs is from 160° to 170°; that of the others rises to 200° or more. The principal collections are the upper and lower geyser basins of the Madison river and the calcareous springs on Gardiner's river. (See GEYSERS.) The grand cañon of the Yellowstone, Great falls, 350 ft. or more in height, Tower falls, &c., are very remarkable. The park is also one of the most interesting geographical localities in North America, having within its limits or in its vicinity the sources of vast rivers flowing in various directions. On the N. side are the sources of the Yellowstone; on the W. those of the principal forks of the Missouri; on the S. W. and S. those of Snake river, flowing into the Columbia and through it into the Pacific ocean, and those of Green river, a branch of the great Colorado, which empties into the gulf of California; while on the S. E. side are the numerous head waters of Wind river.—The geological formations of Wyoming are varied, though not minutely known, including the tertiary, cretaceous, eozoic, Cambrian and Silurian, triassic and Jurassic, and volcanic. Its mineral resources have been but slightly developed. An abundance of iron ore is known to exist, and considerable quantities of pure red hematite have been shipped from Rawlins to Utah, to be used as a flux in the smelting of argentiferous lead ores. The manufacture of iron or steel has hitherto been prevented by the lack of a suitable metallurgical fuel. The extensive coal beds of the territory furnish a fine lignite (probably tertiary in age), which has not yet been successfully coked. It is used as domestic fuel, and for the manufacture of gas and the generation of steam. The principal localities where it is mined are Carbon, Rock Springs, and Evanston. The chief companies are controlled and most of the product is consumed by the Union and Central Pacific railroads. Mining commenced in the latter part of 1868, and down to the end of 1874 the aggregate product was about 1,000,000 tons (of 2,000 lbs.). In 1875 it was about 300,000 tons. The Sweetwater district, in Sweetwater co., about 12 m. N. of the South pass on the old California overland route, contains gold diggings (in gulches) of limited extent, and a considerable number of auriferous quartz veins, a few of which have been successfully worked for short periods. The mountains W. of Laramie City have been the scene of numerous discoveries and some activity in mining. But the product of gold has not been large, probably not over $100,000 per annum since 1869, when operations may be said to have commenced. Recently important developments in gold-quartz mining have been reported from the neighborhood of Laramie City. Veins of copper, gold, and silver have been found in the hills 20 m. N. W. of Cheyenne. Lead, plumbago, and petroleum also occur. About 65 m. from Rawlins are two lakes containing great quantities of soda, the larger covering about 200 acres and the smaller about 3½ acres.—The climate varies with the altitude, being severe on the higher mountains and comparatively mild in the sheltered valleys. The air is pure and bracing. But little rain falls. The mean temperature at Cheyenne (lat. 41° 12′, lon. 104° 42′, altitude 6,058 ft.) from Oct. 1, 1871, to Sept. 30, 1872, was 44·2°; total rainfall, 14·155 inches. The mean temperature of August, the warmest month, was 65·1°; of January, the coldest, 26·6°. From July 1, 1874, to June 30, 1875, the mean temperature at the same place was 43·6°; total rainfall, 8 inches. The mean temperature of July, the warmest month, was 71·8°; of January, the coldest, 12·5°; maximum observed, 98° (in July); minimum, −38° (in January). The soil in the valleys of the streams and along the bases of many of the mountain ranges is fertile, and where irrigation is practicable wheat, oats, rye, barley, and various vegetables yield well. The uplands produce nutritious grasses, upon which cattle and horses graze throughout the year without shelter. The arable lands are limited in extent, but large portions of the territory are admirably adapted to the raising of horses, cattle, and sheep. Timber is found chiefly in the mountains and at the heads of the streams. In the mountains the principal varieties are pine, cedar, fir, and hemlock; on the streams, cottonwood and quaking asp. In 1870 there were only 4,341 acres of land in farms, of which but 338 were improved; estimated value of all farm productions, including betterments and additions to stock, $42,760; value of all live stock, $441,795. The principal productions were 30,000 lbs. of wool and 3,180 tons of hay. There were on farms 584 horses, 283 mules and asses, 707 milch cows, 922 working oxen, 9,501 other cattle, 6,409 sheep, and 146 swine; besides which there were 3,169 horses and 25,342 neat cattle not on farms. There were 32 manufacturing establishments, employing 502 hands; capital invested, $889,400; value of products, $765,424. There are about 490 m. of railroad in the territory, viz.: Union Pacific, 480 m., and Denver Pacific, 10 m. The former passes through the S. portion from E. to W., and at Sherman attains its greatest elevation, about 8,240 ft.; the latter extends from Cheyenne to Denver, Colorado, 106 m. There are two national banks, with a joint capital of $125,000.—The governor and secretary are appointed by the president with the consent of the senate for four years. A treasurer, auditor, and territorial librarian are appointed by the governor with the consent of the council for two years. The legislature consists of a council of 13 members and a house of representatives of 27 members, elected for two years, and holds biennial sessions. The judicial power is vested in a supreme court, three district courts, a probate court for each county, and justices of the peace. The supreme court has appellate jurisdiction, and consists of a chief justice and two associates, appointed by the president with the consent of the senate for four years. The district courts have general original jurisdiction, and are held by a single judge of the supreme court. The probate judges are elected in the respective counties for two years. A territorial act of Dec. 10, 1869, extended the right to vote and hold office to women. The assessed value of property in 1870 was $5,516,748 ($863,665 real estate and $4,653,083 personal property); true value, $7,016,748; total taxation, $34,471 ($6,163 territorial and $28,308 county). The assessed value of property in 1875 was $8,684,000; territorial taxation thereon, $26,052 24, besides which there is a poll tax of $2 on each person 21 years old and upward. The territorial finances for the two years 1873–'5 were as follows: on hand at the beginning of the period, $3,907 02; receipts, $36,485 08; expenditures, $30,805 74; balance, $8,776 37. There is no territorial debt. The territorial librarian is *ex officio* superintendent of public instruction. A county superintendent is elected in each county for two years, and three directors are elected annually in each school district. The public schools are free to all between 7 and 21 years of age. A tax of two mills on the dollar is annually levied in each county for school purposes. In 1875 there were 13 public school houses, 7 male teachers, 16 female teachers, and 1,222 pupils enrolled; total amount paid for teachers' wages, $16,400; total value of school houses and furniture, $32,500. According to the census of 1870, there were six newspapers (two daily and four weekly), issuing 243,300 copies annually, and having a circulation of 1,950; and 31 libraries, with 2,603 volumes, of which 20, with 1,500 volumes, were private. There are now (1876) 16 churches (2 Baptist, 1 Congregational, 3 Episcopal, 2 Methodist, 4 Presbyterian, and 4 Roman Catholic), with more than 4,500 sittings and property to the value of $50,000.—The territory of Wyoming was organized by the act of July 25, 1868, from portions of Dakota, Idaho, and Utah. The first settlements within its limits were made in 1867, during the progress of the Union Pacific railroad. (See supplement)

WYOMING. I. A W. county of New York, bounded S. E. by the Genesee river, and drained by affluents of that stream, and Tonawanda, Buffalo, and other creeks; area, 590 sq. m.; pop. in 1870, 29,164; in 1875, 30,595. The surface is generally broken and hilly, and the soil fertile and well adapted to stock raising. It is intersected by the Erie railroad. The chief productions in 1870 were 272,372 bushels of wheat, 193,249 of Indian corn, 514,862 of oats, 164,958 of barley, 42,314 of buckwheat, 58,834 of peas and beans, 243,624 of potatoes, 1,561,291 lbs. of butter, 709,935 of cheese, 255,661 of wool, and 105,118 tons of hay. There were 9,529 horses, 24,331 milch cows, 10,362 other cattle, 56,823 sheep, and 7,294 swine; 6 manufactories of agricultural implements, 2 of bricks, 31 of carriages and wagons, 32 of cheese, 1 of wrapping paper, 13 tanneries, 23 flour mills, 2 woollen mills, and 15 saw mills. Capital, Warsaw. **II.** A N. E. county of Pennsylvania, intersected by the North branch of the Susquehanna river, and drained by Tunkhannock, Mahoopeny, and other large creeks; area, 345 sq. m.; pop. in 1870, 14,585. The surface is generally hilly or mountainous, Mahoopeny, Tunkhannock, Knob, and Bowman's mountains occupying a portion. The soil is fertile. Timber, coal, and iron are very abundant. It is intersected by the North Branch canal, and by the Delaware, Lackawanna, and Western and the Lehigh Valley railroads. The chief productions in 1870 were 71,891 bushels of wheat, 38,334 of rye, 187,213 of Indian corn, 250,048 of oats, 124,983 of buckwheat, 286,525 of potatoes, 449,532 lbs. of butter, 18,615 of wool, and 17,258 tons of hay. There were 2,987 horses, 5,814 milch cows, 4,908 other cattle, 6,857 sheep, and 3,398 swine; 13 manufactories of carriages and wagons, 4 of iron castings, 8 tanneries, 3 currying establishments, 11 flour mills, and 18 saw mills. Capital, Tunkhannock. **III.** A S. county of West Virginia, bordering S. W. on Virginia and drained by the branches of Sandy and Guyandotte rivers; area, about 500 sq. m.; pop. in 1870, 3,171, of whom 41 were colored. The surface is mountainous, and the greater part covered with forests of valuable timber. Great Flat Top mountain extends along the S. E. border. The soil is moderately fertile. The chief productions in 1870 were 2,150 bushels of wheat, 57,899 of Indian corn, 11,073 of oats, 5,962 of Irish and 2,269 of sweet potatoes, 32,329 lbs. of butter, 5,630 of wool, and 594 tons of hay. There were 345 horses, 1,042 milch cows, 1,582 other cattle, 2,827 sheep, and 3,338 swine. Capital, Oceana.

WYOMING VALLEY (a corruption of the Indian *Maughwauwama*, large plains), a beautiful and fertile tract on the Susquehanna river in Luzerne co., Pennsylvania. It lies N. E. and S. W., having an average breadth of 3 m. and a length of 21 m., and is enclosed by ranges of rugged mountains about 1,000 ft. high. It is rich in coal. (See ANTHRACITE, and LACKAWANNA.) The valley was purchased from the Six Nations in 1754 by an association formed in Connecticut and called the Connecticut Susquehanna company; but no permanent settlement was attempted till 1762. The next year the settlers were dispersed by the Indians. In 1769 a body of 40 Connecticut pioneers was sent thither by the Susquehanna company, but found themselves forestalled by some Pennsylvanians, the Six Nations having in the preceding year again sold the territory to the proprietaries of Pennsylvania; and for the next six years Wyoming was the scene of numerous conflicts between settlers from the two colonies, both of which under their charters, as well as by purchase, claimed possession of the soil. The Connecticut people, however, so far succeeded in maintaining their hold in the valley, that at the commencement of the revolutionary war they had established there a flourishing town called Westmoreland, containing more than 2,000 inhabitants. On June 30, 1778, a body of 400 British provincials with about 700 Indians, under the command of Col. John Butler, entered the valley, which was ill prepared for defence, many of its best men having fallen in the continental armies. On July 3 Forty fort (so called from the 40 Connecticut pioneers), the principal fortification, was summoned to surrender. A consultation ensued, and the available military force, comprising about 300 men of all ages under command of Col. Zebulon Butler, a continental officer, having decided to give battle, were on the same day, after a desperate struggle, defeated and driven back to the fort, with a loss of more than two thirds of their number, who were massacred by the Indians and tories with every circumstance of savage cruelty, not even the prisoners being spared. Some of the latter were put to death on the evening of the battle, and Queen Esther, a half-breed Indian woman, to avenge the death of her son, tomahawked 14 with her own hands near a rock which still bears her name. On the 5th the fort surrendered; and notwithstanding the promises of the British commander, the Indians showed so little respect for property or life, that most of the surviving inhabitants fled from the valley. The whole number who perished during the war by violent deaths probably exceeded 300. The barbarities perpetrated by the Indians and tories, shocking as they were, were greatly exaggerated by contemporary and succeeding narrators. Brant, the Mohawk chief, whom Campbell in his "Gertrude of Wyoming" stigmatizes as one of the principal actors in the tragedy, it is now generally believed, upon his own testimony and that of his friends, took no part in Butler's invasion.—The troubles of Wyoming by no means ended with the war. The vexed question of title to the territory, which had remained in abeyance between Connecticut and Pennsylvania, was revived in 1782, and a commission, appointed by congress to decide upon the controversy, reported in favor of Pennsylvania. But upon an attempt by the authorities of that state to eject the Connecticut settlers from their lands, the latter again took arms, and for several years the conflicts of the early colonists were renewed. In 1787 the legislative assembly of Pennsylvania confirmed the settlers in their possessions, but it was not until after the commencement of the present century that all the land claims were quieted by law. Wyoming is now the centre of a rich agricultural and mining region. A monument was erected in 1843 on the site of the battle field of July 3.—See "History of Wyoming," by Charles Miner (Philadelphia, 1845), and "Wyoming," by George Peck, D. D. (New York, 1858).

WYSS, Johann Rudolf, a Swiss author, born in Bern, March 13, 1781, died there, March 30, 1830. He was educated at German universities, and in 1806 became professor of philosophy in the academy at Bern, and subsequently chief librarian. His works include *Vorlesungen über das höchste Gut* (2 vols., Tübingen, 1811); *Der schweizerische Robinson* (Bern, 1813), translated into numerous languages, and known in English as "The Swiss Family Robinson;" *Idyllen, Volkssagen, Legenden und Erzählungen aus der Schweiz* (3 vols., 1815–'22; partly translated into French in Mme. de Montolieu's *Châteaux suisses*, 1816); and *Reise im Berner Oberland* (1808; French translation, 2 vols., Bern, 1817).

WYTHE, a S. W. county of Virginia, intersected by the Great Kanawha (here called the New) river; area, about 600 sq. m.; pop. in 1870, 11,611, of whom 2,342 were colored. It is mostly an elevated plateau, lying between

Iron mountain on the south and Walker's mountain on the northwest, and the soil is generally fertile. Iron ore, lead, bituminous coal, limestone, and gypsum are very abundant, and there are traces of silver found in the lead mines. It is intersected by the Atlantic, Mississippi, and Ohio railroad. The chief productions in 1870 were 71,913 bushels of wheat, 17,913 of rye, 115,175 of Indian corn, 79,234 of oats, 17,057 of potatoes, 86,144 lbs. of butter, 19,827 of wool, and 4,445 tons of hay. There were 2,176 horses, 2,376 milch cows, 5,550 other cattle, 7,442 sheep, and 8,160 swine; 3 manufactories of pig iron, 1 of pig lead, and 6 flour mills. Capital, Wytheville.

WYTHE, George, a signer of the American Declaration of Independence, born in Elizabeth City co., Va., in 1726, died in Richmond, June 8, 1806. He was admitted to the bar in 1757, and in 1758 was elected to the Virginia house of burgesses, by which he was appointed in 1764 on the committee to prepare a petition to the king, a memorial to the house of lords, and a remonstrance to the house of commons against the proposed stamp act, the last of which he wrote. He was a member of the continental congress in 1775-'7, and in 1776 was one of the committee to revise the laws of Virginia. In 1777 he was chosen speaker of the house of delegates, and was appointed a judge of the high court of chancery; and on the reorganization of that court he became sole chancellor, which office he held till his death. He was professor of law in William and Mary college from 1779 to 1789. In the latter part of his life he emancipated his slaves and furnished them means of subsistence. He died suddenly from accidental poisoning. He was the author of "Decisions by the High Court of Chancery" (1795; 2d ed., with a memoir by B. B. Minor, 1852).

WYTTENBACH, Daniel, a Dutch philologist, born in Bern, Switzerland, Aug. 7, 1746, died in South Holland, Jan. 17, 1820. He studied philology at Marburg, Göttingen, and Leyden, and in 1771 became professor of Greek and subsequently of philosophy at Amsterdam, and in 1799 of eloquence at Leyden. He edited Plato's *Phædo* and Plutarch's *Moralia* and *Animadversiones.* His other works include *Præcepta Philosophiæ Logicæ* (Amsterdam, 1782); *Bibliotheca Critica* (3 vols., 1777-1808); *Philomathia, sive Miscellanea Doctrina* (3 vols., 1809-'17); *Vita Ruhnkenii* (Leyden, 1800); and *Opuscula Varii Argumenti* (2 vols., 1821). Mahne has edited his select correspondence, entitled *Epistolarum Selectarum Fasciculi tres* (Ghent, 1830).

X

X, THE 24th letter of the English alphabet. It represents in English, and generally in French also, the combined sounds of *cs* as in the word *texture*, and of *gs* as in the word *example*, except at the beginning of words, where it has the sound of *z*. Its form and position in the alphabet are apparently borrowed from those of the Greek χ, while its sound is that of ξ, the 14th letter of the Greek alphabet. In Italian it is not used, *s* and *c* being substituted for it, as in *esatto*, exact, *eccellente*, excellent. In Spanish it has at the end of syllables the same value as in English; at their beginning it is, like the Spanish *j*, a guttural, nearly equivalent to the German *ch*. In Portuguese it represents several sounds, but most frequently that of the English *sh*. In Russian the X represents the sound, as it retains the character, of the Greek χ. As a Latin numeral, X stands for 10; the Greek ξ stood for 60, and χ for 600.

XALAPA. See Jalapa.

XALISCO. See Jalisco.

XANTHINE, a compound often found in urinary calculi, discovered by Marcet in a calculus weighing only 8 grs. According to Scherer, xanthine is a normal constituent of the body of many animals. He has found it in the urine of man, in the pancreas, spleen, and liver of oxen, in the thymus gland of the calf, and in the muscular flesh of the ox, the horse, and fishes. The formula of xanthine is $C_5H_4N_4O_2$. It may be artificially produced from uric acid, from which it differs only by one atom of oxygen, by the action of sodium amalgam, and from guanine by the action of nitric acid. It is nearly insoluble in cold water, sparingly soluble in boiling water, and insoluble in alcohol and ether. When heated in the air it burns with the smell of burnt hair. It unites with both acids and bases, forming usually crystallizable compounds.

XANTHIPPE. See Socrates.

XANTHORHAMNINE, a yellow coloring matter obtained from Persian or Turkey berries, the seeds of *rhamnus amygdalinus*, *R. oleoïdes*, *R. saxatilis*, and *R. infectorius.* According to Kane, its formula is $C_{23}H_{24}O_{14}$, and it occurs only in the ripe seeds, being formed by the decomposition of chrysorhamnine contained in the unripe seeds. It may be also formed by boiling the unripe berries in water. It forms precipitates with the alkaline-earth metals, and aluminic and stannic salts. It dyes fabrics mordanted with alumina a fine yellow, and those mordanted with iron salts black.

XANTHUS, a town of Lycia. See Lycia.

XAVIER, Saint Francis (Francisco de Xavier), a Spanish missionary, called the apostle of the Indies, born at the castle of Xavier, near

Obaños, in Navarre, April 7, 1506, died in the island of Sau Chau, near Macao, China, Dec. 2, 1552. His father, Don Juan de Jasso, was councillor of state to Jean d'Albret, king of Navarre, and his mother, Maria de Xavier y Azpilqueta, was sole heiress of the two noble houses of those names. He graduated master in philosophy at the college of Ste. Barbe in Paris in 1530, and lectured on Aristotle in the collége de Beauvais. In the former college he occupied the same room with Ignatius Loyola, and at first looked upon him with fear and aversion on account of his ascetic practices; but he was soon won over, and became one of his first associates in the company of Jesus. (See JESUITS.) He joined Ignatius in Venice in January, 1537, was ordained priest there, and instructed the poor of Bologna, where he fell ill of fever. He preached and taught poor children in Rome from March, 1538, till March, 1540. The king of Portugal having asked Ignatius to send him missionaries for the Portuguese settlements in the East Indies, Xavier was one of the two selected, and eventually went alone to India. He travelled on foot to Lisbon, where he labored with such zeal among all classes that the king and clergy wished to keep him in the country; but he could not be diverted from his purpose, and the king procured his appointment as apostolic nuncio in the Indies, with most ample powers. He sailed from Lisbon, April 7, 1541. When the scurvy broke out, Xavier devoted his whole time to the diseased crew. He touched at Mozambique, Melinda, and Socotra, preaching with very remarkable effect wherever he landed, and on May 6, 1542, reached Goa, the capital of the Portuguese Indies. He took up his abode in the hospital, and every day went with a bell in his hand through the streets, calling upon the Christian inhabitants to send their children and slaves to be instructed in the faith. In a short time he is said to have effected almost a complete reformation of the city. From Goa he went to the coast of Comorin and the island of Ceylon, and afterward, making Malacca his headquarters, visited many other parts of the East, baptizing vast numbers of the natives, and leaving wherever he went flourishing congregations under the care of his disciples. Other missionaries arrived from Europe, and in 1549 he went to Japan, where he was permitted freely to preach the gospel; and when he set sail for Goa in December, 1551, he left three of the great princes of the empire Christians, besides having baptized immense numbers of the common people. His intention to penetrate into China was frustrated by his sudden death. His remains were taken to Goa and deposited in a chapel near the city. During his 10 years' apostleship he is said to have planted the faith in 52 different kingdoms, preached the gospel through 9,000 miles of territory, and baptized more than 1,000,000 persons. Many miracles were ascribed to Xavier, and he was beatified by Pope Paul V. in 1619, and canonized by Gregory XV. March 12, 1622. His works comprise letters, a catechism, &c., all published by H. J. Coleridge ("The Life and Letters of St. Francis Xavier," 2 vols, London, 1872). His life was written in Latin by Tursellini (Rome, 1594) and Bartoli (Lyons, 1666), and in French by Bouhours (Paris, 1682; translated into English by Dryden, London, 1688).

XENIA, the presents given to the guests after a banquet by the ancient Greeks and Romans, and hence the title of the 13th book of Martial's epigrams, which consists of distichs referring to this custom. In the *Musenalmanach* for 1797 appeared a collection by Goethe and Schiller of over 400 distichs entitled *Xenien*, which were acute, epigrammatic criticisms upon art, society, current literature, &c. Their personalities and caustic style called forth many replies. Later, Goethe alone published *Zahme Xenien*, a series of genial reflections upon art and life in epigrammatic form.

XENIA, a city and the county seat of Greene co., Ohio, at the junction of several divisions of the Pittsburgh, Cincinnati, and St. Louis railroad, about 50 m. N. E. of Cincinnati and W. S. W. of Columbus respectively; pop. in 1850, 3,024; in 1860, 4,658; in 1870, 6,377; in 1876, estimated at 9,000. It is well paved, lighted with gas, and has a good fire department. There are many substantial business blocks and elegant residences. The chief public buildings are the court house, one of the finest in the state, in a large and handsome park in the centre of the city; the city hall, containing a fine public hall; and the jail. Xenia has an important trade, and is largely engaged in manufacturing. There are planing mills, saw mills, glass works, oil mills, marble and granite works, a large brewery, an extensive bakery, and manufactories of rope, bagging, agricultural implements, pumps, carriages and wagons, furniture, and tin ware. Four firms are engaged in pork packing. There are two national banks. The principal charitable institutions are the city hospital and the Ohio soldiers' and sailors' orphans' home. The grounds of the latter, about 200 acres in extent, are very attractive, and contain about 50 buildings, accommodating 700 inmates. There are six fine public school buildings, several private schools, a conservatory of music, a commercial college, three weekly newspapers, and 15 churches, viz.: 2 Baptist (1 colored), 1 Episcopal, 1 Lutheran, 3 Methodist Episcopal (1 colored), 1 Presbyterian, 1 Reformed, 1 Roman Catholic, 1 Seceder, 3 United Presbyterian, and 1 Wesleyan Methodist (colored), besides a Spiritualist society. It is the seat of Xenia college (Methodist Episcopal) and of a United Presbyterian theological seminary. Wilberforce university (African Methodist Episcopal) is a short distance outside of the city limits. Xenia college occupies two fine buildings in a large wooded park in the E. part of the city. It has primary, normal, preparatory, and collegiate departments, and admits both sexes. It was incorporated in 1850. In 1873–'4 there were 5 instructors and 167 students, of whom 122 were of collegiate grade. Wilberforce university, especially designed for the higher education of colored youth of both sexes, was incorporated in 1863. It has preparatory, normal, classical, scientific, theological, and law departments, and a library of 4,000 volumes. In 1873–'4 there were 12 instructors and 173 students (12 collegiate and 8 theological). The building is finely situated. The theological seminary was organized in 1794, and in 1873–'4 had 5 instructors, 29 students, and a library of 3,500 volumes.—Xenia was settled in 1804 and incorporated about 1808.

XENOCRATES, a Greek philosopher, born in Chalcedon in 396 B. C., died in 314. He attached himself successively to Æschines the Socratic and to Plato, whom he accompanied to Syracuse. After the death of Plato he was repeatedly sent on embassies to Philip of Macedon, and during the Lamian war to Antipater. In 339 he succeeded Speusippus as director of the academy, and held that post till his death. He wrote several metaphysical treatises, two works on physics, and several on ethics and political economy. Aristotle and Theophrastus wrote upon his doctrines, but our knowledge of them is very incomplete. He identified ideas with numbers, and founded upon these a mystical theology, defining the soul as a self-moving number. He taught that the value of everything besides virtue is conditional, and that happiness results from its possession and practice.

XENOPHANES, a Greek philosopher, born in Colophon, Ionia, about 570 B. C., died in Elea, southern Italy, about 480. He quitted his native town as an exile, and probably lived for some time in Elea. He is regarded as the founder of the Eleatic school. He strongly combated the anthropomorphism of Hesiod and Homer, contending that God is one, self-existent, unchangeable, the universal supreme intelligence. The few fragments of his poems extant were published by Karsten (1830), and are also given in Schneidewin's *Elegiaci Græci* (1838), and those which relate to philosophy in Ueberweg's *Grundriss der Geschichte der Philosophie.* (See ELEATIC SCHOOL.)

XENOPHON, an Athenian author, the son of Gryllus, a native of the demus of Erchea, and of the order of knights. The date of his birth is uncertain. Some, accepting the statement of Diogenes Laërtius and Strabo that he was in the battle of Delium in 424 B. C., place it as early as 444; others fix upon 431. He is said to have been 90 years old when he died. Almost nothing is positively known of his early years, save that he became a pupil of Socrates. In 401 he went to Sardis on the invitation of his friend Proxenus, who was on intimate terms with the younger Cyrus, and promised to introduce him to the Persian prince. He joined the expedition of Cyrus, but without any special office in the army. The object of the expedition was unknown to the Greeks in the employ of Cyrus; they were, however, induced by the promise of higher pay to adhere to the commander after his intention of dethroning his brother Artaxerxes II., the reigning king of Persia, was disclosed. Cyrus lost his life at the battle of Cunaxa, and the Greeks then began that return to Europe which has become famous as the retreat of the 10,000. When Clearchus and other Greek leaders had been treacherously massacred by the satrap Tissaphernes, Xenophon, who had acted hitherto as a volunteer, assembled the officers, and pointed out to them the only practicable course to be pursued. His confidence, his practised talent, and his rhetorical powers enabled him to influence the soldiers. He was elected one of the five generals, and appointed to the command of the rear guard, and by degrees came to be regarded as the controlling head of the army. He conducted the troops through many trials and perils across Mesopotamia and through the mountainous regions of Armenia to Trapezus on the Euxine, and thence to Europe, and was thus the first to demonstrate the invincible character of a body of trained Greek soldiers, and to point out the pathway to conquest which was afterward followed by Alexander the Great. After handing over his troops to the Spartan general Thimbron (399), he is supposed to have returned to Athens. Three years afterward he was serving in Asia under Agesilaus, the Lacedæmonian king. In the mean while war sprang up anew between Sparta and Athens, and Xenophon, accompanying his leader back to Europe, was present (though probably not a combatant) at the battle of Coronea in 394. Athens now passed against him a sentence of banishment. The Lacedæmonians rewarded him for his attachment to their cause by allowing him land and a house at Scillus, a village of Triphylian Elis. After the battle of Leuctra in 371 he was expelled by the Eleans from his residence, and is said to have taken up his abode in Corinth. Not long afterward peace was concluded between Athens and Sparta, followed by a close alliance. The sentence of exile passed against Xenophon was revoked, and some of the last years of his life were probably spent in Athens. In character he appears to have been humane and cheerful, although not a little selfish, and deeply religious and superstitious.—Xenophon's style has been uniformly praised by critics both ancient and modern, and Diogenes Laërtius calls him the "Attic muse." Of his historical works, the best is the *Anabasis*, descriptive of the advance into Persia, and the retreat of the 10,000 Greeks. It abounds in interesting information. The *Hellenica*, in seven books, is a history of Grecian affairs from the time at which Thucydides ends his narrative to the battle of Mantinea in 362. It is generally an unentertaining account, disfigured by his partiality for Agesilaus and undisguised admiration for the oligarchical spirit of Sparta. The *Cyropædia* is a political romance, in which the author gives his ideas of the state, and pictures the advantages of a wise despotism, taking as a basis the history of Cyrus the Great. The *Agesilaus* is a panegyric on his friend and commander. The *Hipparchicus* is a treatise on the duties of a cavalry officer; the *Hippike*, on the horse itself; and the *Cynegeticus*, on the dog and the chase, to which recreation Xenophon was much addicted. The two treatises on the republics of Sparta and of Athens manifest still more plainly than his other works his prejudices against a democratic form of government. The treatise on the "Revenues" of Athens is a short tract, which is said to have been written by him after his return to his native city as a peace offering to his countrymen. The *Hiero* is an imaginary dialogue between the king of Syracuse of that name and the poet Simonides on the advantages and disadvantages of the possession of absolute power. The other works of Xenophon are records of the acts and conversations of Socrates. Of these, by far the best known is the *Memorabilia*, in which he undertakes to defend his idolized but hardly well understood master against the charge of irreligion and of corrupting the youth of Athens. It consists of a series of conversations, all of which turn upon the duties of active life; and in no other of his works does Xenophon show more clearly that taste for practical pursuits and matters which was the leading element in his character. The "Apology" for Socrates is a short treatise defending the conduct of that philosopher after he had been pronounced guilty, and giving the reasons why he preferred death to life. The *Symposium* or "Banquet" is the narration of a conversation at a feast given by Callias, in which the guests, among whom is Socrates, discuss the nature of love and friendship. The *Œconomicus* is a dialogue carried on between Socrates and Critobulus in regard to agriculture and the management of household affairs. The best editions of his collected works are those of Weiske (6 vols. 8vo, Leipsic, 1798–1804), Schneider (revised by Bornemaun and Sauppe, 6 vols. 8vo, Leipsic, 1825–'49), and L. Dindorf, published by Teubner (3 vols. 12mo, Leipsic, 1869–'73). Of separate works, especially the *Anabasis*, the editions are very numerous. The latest and best English translation of Xenophon's works is that by the Rev. J. S. Watson, in Bohn's "Classical Library."

XEREZ. See JEREZ.

XEREZ, Francisco de, a Spanish historian, who accompanied Pizarro in his conquest of Peru as secretary. At his command he wrote a detailed account of the expedition, addressed to Charles V., which was published at Salamanca in 1547, under the title of *Verdadera relacion de la conquista del Pirú y de la provincia del Cuzco llamada la Nueva Castilla*, &c. Translations may be found in Ramusio's and Ternaux-Campans's collections. It is sometimes appended to Oviedo's "Natural History of the Indies."

XERXES, a king of Persia, who reigned from the close of 486 to 465 B. C. He was the son of Darius Hystaspis and Atossa. His first achievement on coming to the throne was the suppression of the Egyptian revolt which had interrupted his father's preparations for the invasion of Greece. He then resumed those preparations, and spent four years in raising as great a force as his powerful empire could furnish. In the autumn of 481 the army assembled at or near Sardis, and a fleet was collected in the Hellespont or on the coast of Asia Minor. Xerxes caused a bridge of boats to be thrown across the Hellespont, from Abydos to the western shore. It was destroyed by a storm, and Herodotus relates that he commanded a pair of fetters to be thrown into the stream, and the water to be scourged with 300 lashes. Two new bridges were now thrown across the strait. A canal, wide enough for two triremes abreast, had been cut through the isthmus which separated Mount Athos from the mainland. Early in 480 his army began its march from Sardis, and spent seven days and nights in crossing the Hellespont. At Doriscus, in Thrace, Xerxes held a review of the whole army, and according to Herodotus it amounted to 1,700,000 foot and 80,000 horse, with Libyan war chariots and Arabian camels. Besides these, upon the fleet of 1,207 ships of war and 3,000 smaller vessels and transports, was a force which swelled the number of combatants to 2,317,000. The statement is doubtless exaggerated, though the army was very probably the greatest ever assembled. These forces traversed Thrace and Macedonia unopposed, and entered Greece through the mountain passes, over the range of Olympus. All northern Greece was abandoned, and the first resistance was at the defile of Thermopylæ. In the mean time a terrible storm destroyed 400 ships of war, and a vast number of transports and smaller vessels. The naval battles of Artemisium and Salamis followed, and Xerxes was easily persuaded to leave the conquest of Greece to Mardonius and 300,000 troops, while he himself returned to Asia. After 45 days' march he reached the Hellespont, and he reentered Sardis defeated and humbled. While he remained there in the summer of 479, the disastrous battles of Platæa and Mycale occurred, followed by the utter overthrow of all the Persian power in Greece. (See GREECE, vol. viii., pp. 189–'90.) Little is known of the personal history of Xerxes after this time. In 465 he was murdered by Artabanus, one of the highest officers of the court, and the eunuch Spamitres or Mithridates, and was succeeded by his son Artaxerxes. Herodotus says that for beauty and stature none in the vast host he led against Greece could be compared with Xerxes; but he also represents him as exceedingly cowardly and cruel. He is believed by many critics to be the Ahasuerus of the book of Esther.

XIMENES (or **Ximenez**) **DE CISNEROS, Francisco,** cardinal, a Spanish statesman, born at Torrelaguna, New Castile, in 1436, died at Roa, on the Douro, Nov. 8, 1517. He graduated in both civil and canon law at the university of Salamanca in 1456. In 1459 he went to Rome, where for six years he was advocate in the consistorial courts. He was appointed by the pope to the living of Uzeda, near his native place, but his claim was resisted by the archbishop of Toledo, who imprisoned him in the tower of Santorcaz for six years. He was released in 1480, and soon after exchanged his benefice for a chaplainship in the diocese of Sigüenza. Here he devoted himself to theological studies, and mastered Hebrew and Chaldee. In 1482 he resigned all his employments, and entered a Franciscan convent in Toledo. After three years spent in rigid self-mortification and devotions, a part of the time in a mountain retreat, in a little cell built with his own hands, he became superior of the convent of Salzeda. In 1492 he was appointed confessor to Queen Isabella, which office he accepted only on condition that he should be allowed to conform to the vows of his order, and to retain his monastic habits and residence when not required at court. By this time Ximenes had become known throughout Spain, and was everywhere reverenced for his sanctity. In 1494 he was appointed provincial of his order in Castile; he made his official journeys invariably on foot, subsisting on alms. In the next year he was nominated by the queen archbishop of Toledo and primate of Spain, which office he accepted only at the command of the pope. Its vast revenues he dispensed mostly in charities, retaining his simple habits and severe monastic observances. Hardly had he been installed in office before he began a vigorous scheme of reform among the Spanish clergy; but his inflexible severity met with much opposition, and upward of 1,000 Franciscan friars, it is said, took refuge in Barbary. The queen sustained the primate, and a permanent amendment was effected in the morals and discipline of the religious orders. He next determined to compel the Moors of the conquered province of Granada to receive baptism; but those of the city rose in open rebellion and besieged him in his palace, and to his persistent efforts in this direction is attributed the rising in the Alpujarras in 1500. One of the least creditable acts in the life of Ximenes was the destruction at this time of a collection of Arabic manuscripts, amounting to many thousands, the loss of which was the immediate cause of the decay of Arabian literature and scholarship in the Spanish peninsula. But he made some amends by founding (1500–'10) the famous university of Alcalá de Henares, and by his celebrated polyglot Bible, usually called the Complutensian polyglot, from Complutum, the Latin name of Alcalá, where it was printed. (See POLYGLOT.) On the death of Queen Isabella in 1504, Ximenes became the mediator between the rival claimants of the regency of Castile, King Ferdinand and the archduke Philip, the husband of Joanna, heiress of the crown; and upon the death of Philip, two years later, he assumed, during the absence of Ferdinand in Italy, the presidency of a provisional council or regency which carried on the government of Castile. Owing to the insanity of Joanna, the affairs of the kingdom were for more than a year in a critical condition; but the vigorous counsels and conduct of Ximenes preserved order until the return of Ferdinand and the assumption by him of the regency. In 1507 Ximenes received a cardinal's hat from Julius II., and was appointed inquisitor general of Castile. In 1509, chiefly at his own expense, he conducted an expedition against Oran, a noted resort of pirates, and secured to the crown large spoils and a rich possession on the African continent. Ferdinand at his death, Jan. 23, 1516, by the unanimous advice of his counsellors, left Ximenes regent of the kingdom until the arrival of his grandson Charles I. of Spain, afterward Charles V. of Germany. Fortified in this appointment (nominally shared by Adrian of Utrecht, afterward Pope Adrian VI.) by a confirmatory letter from Charles, the octogenarian cardinal entered upon the duties of his office with vigor. One of his first acts was the enrollment of the burgesses in military corps, which proved a powerful agent in overthrowing the feudal system in Spain, and in preserving his own authority against the pretensions of the grandees. With the aid of this force he proclaimed Charles king of Castile, notwithstanding the fact that Joanna, though in a state of hopeless insanity, was the legal queen. The opposition of the grandees he completely quelled. Jean d'Albret, the dispossessed king of Navarre, aided by several powerful grandees, made an attempt to recover his kingdom, but was signally defeated. The cardinal also equipped a large armament against the Barbary corsairs; attempted to ameliorate the condition of the natives in the American colonies, the introduction of negro slavery into which he earnestly but ineffectually opposed; extended the inquisition into all parts of the Spanish dominions, confirming and greatly enlarging its powers; and instituted many important domestic reforms by which the royal revenues were greatly increased. At length, on Sept. 17, 1517, the young king landed at Villaviciosa in Asturias, and addressed to the aged primate a letter in which, after formally thanking him for past services, he granted him permission to retire to his diocese. Ximenes received the letter while lying ill at Roa, whither he had been removed from the Franciscan convent of Aguillera, near Aranda: his exhausted frame yielded to a return of fever, of which he died within a few hours.—The most authentic account of his life is the biography by Alvaro Gomez de Castro, who was specially appointed by the university of Alcalá to undertake the task. See also Hefele, *Der Cardinal Ximenes und die kirchlichen Zustände Spaniens im 15. Jahrhundert* (2 vols., Tübingen, 1844; 2d ed., 1851; English translation by Canon Dalton, London, 1860).

XIMENES DE QUESADA, Gonzalo, a Spanish explorer, born in Granada about 1495, died at Mariquita, New Granada, Feb. 16, 1579. He came to America in 1535 as a judicial functionary in the suite of Pedro Fernandez de Lugo, governor of the province of Santa Marta, who chose him to head an expedition against the Chibchas, supposed to number more than 2,000,000 souls, on the great plains of Tunja and Bogotá, and the neighboring regions about the head waters of the river Magdalena. He set out April 6, 1536, with a force of 720 infantry and 85 horsemen. Of five vessels and 105 men embarked in them, all were destroyed by storm or by native attacks excepting one vessel which was brought back to Santa Marta by one man. On land the column was hindered by almost insurmountable natural obstacles and the constant assaults of the savages. At the end of eight months they had made no more than 450 m. On reaching the river Bermejo, Ximenes fell sick; but Capt. San Martin explored the upper waters of the river, and reported that a rich and cultivated country was not far distant. Scaling with immense exertion the formidable mountains of Opon, gaining a height of 5,500 ft. above the sea, Ximenes found a land of beauty and abundance, with its population to be conquered, but free from natural obstacles. He now had but 166 men and 60 horses. He resumed his progress on March 2, 1537. The first Indians he met were so terrified by the sight of his horses that they instantly submitted. At Tunja one of the great chiefs of the Chibchas treacherously attacked him, and was captured after much slaughter, Ximenes becoming possessed of vast riches. He then marched upon Iraca, the sacred city of the nation, where the great temple of the sun was accidentally set on fire, and it perished with the city after burning several days. Returning toward Tunja, he fought a desperate and bloody battle at Borja against 12,000 natives, whom he defeated, after which he made treaties with several caciques, who voluntarily submitted. He now divided among his soldiers $250,000 in gold and 1,815 emeralds. Another native chief having been surprised and killed, his people undertook a vigorous resistance; but Ximenes formed an alliance with one of the pretenders to the succession, and gained a battle in which his forces consisted of 40,000 natives and 40 Spaniards. His ally was proclaimed king of the Chibchas, but was required to deliver the treasures of his predecessor to the Spaniards. After a short imprisonment he promised within 40 days to fill a room with gold and emeralds. As he did not keep his promise, he was put to death with cruel tortures. On Aug. 6, 1538, Ximenes founded the city of Bogotá. Shortly afterward arrived Frederman from Venezuela, with about 160 men in a destitute condition, and Benalcázar with about the same force flushed with the conquest and spoils of Quito. Benalcázar wished to combine with Frederman and expel Ximenes from his conquests; but Frederman had already entered the service of Ximenes, and the three leaders, appointing a governor *ad interim* of all their territories, sailed May 12, 1539, from the Magdalena to lay their claims before the emperor Charles V. Frederman was totally unsuccessful; Benalcázar was released from obedience to Pizarro and made governor of Popayan; and Ximenes, after following the court to the Low Countries and spending vast sums in ostentatious living in Italy, France, and Portugal, was finally summoned before the royal council, fined 1,000 ducats, banished for one year, and suspended for five years from his office as judge and captain. The emperor afterward remitted these punishments, and bestowed on him the title of marshal of the kingdom of New Granada, with perquisites worth about 4,000 ducats yearly. He returned to Bogotá in the beginning of 1551, and henceforth distinguished himself as the protector of the people against the adventurous officials and magistrates. In 1561 he was named by the Spanish government *adelantado* or governor-in-chief of the kingdom of New Granada, and afterward spent three years and 300,000 ducats in fitting out an expedition in search of El Dorado, which he thought to find beyond the territories of Pauto and Papamene. He set out with 300 Spaniards, 2,000 Indians, and 1,200 horses, and returned with 24 men and 32 horses. In 1572 he founded the city of Santa Agueda, near Mariquita. He died of leprosy, and by his will declared himself poor, his debts exceeding his property by more than 60,000 ducats. His remains were removed to Bogotá in 1597.—See J. Acosta, *Compendio histórico del descubrimiento y colonizacion de la Nueva Granada* (Paris, 1848), and Antonio de Plaza, *Memorias para la historia de la Nueva Granada* (Bogotá, 1850).

XORULLO. See JORULLO.

XYLENE, or **Xylol,** a hydrocarbon homologous with benzene and toluene, first obtained in a pure state from coal naphtha by Hugo Miller in 1863. Mixed with toluene and several other hydrocarbons, it had been obtained several years previously. It is prepared by subjecting coal naphtha to fractional distillation, and subjecting that portion which boils at about 306° F. to the action of oil of vitriol containing some of the fuming acid, which converts the xylene into xylene-sulphuric acid; and this, being decomposed by dry distillation, yields pure xylene by washing, drying, and redistillation. Its formula is C_8H_{10}. It is a colorless liquid, having a peculiar, faint odor; sp. gr. 0·86 at 66°; boiling point, 282°. Passed in a state of vapor through a red-hot tube, xylene is resolved into a mixture of several hydrocarbons, such as benzene, toluene, naphthaline, and anthracene. Xylene has several derivatives called xylenes, as the bromo-xylenes, chloro-xylenes, ethyle-xylene, methyle-xylene, the nitro-xylenes, and others. When nitroxylene is subjected to the action of ferrous acetate or stannous chloride, a base homologous with aniline is produced, which has received the name of xylidine, $C_8H_{11}N$.

XYLOGRAPHY. See ENGRAVING.

XYLOIDINE, an explosive compound, having the formula $C_6H_9NO_7$, discovered by Braconnot in 1833, and prepared by the action of strong nitric acid upon starch. The starch is triturated in a strong porcelain mortar with five to eight parts of fuming nitric acid till it is reduced to a transparent semi-fluid mass, without evolution of gas. From 20 to 30 parts of water are then added, by which the xyloidine is precipitated as a white, granular mass, a small quantity of starch remaining in solution. The xyloidine is purified by washing and drying, and then dissolving in 10 parts of glacial acetic acid and one part of dihydrated acid, and the solution filtered and evaporated. When struck, xyloidine detonates, but not so violently as gun cotton.

XYRIS. See YELLOW-EYED GRASS.

Y

Y, THE 25th letter of the English alphabet, is in Teutonic and Romanic languages generally a vowel when occurring in the body or at the end of syllables, and an aspirated gutturo-lingual consonant when beginning them, as in the words *yes*, *Yonne*. Its form is derived from the Greek Υ, and in French and Spanish it is called "the Greek I." In English its sound as a vowel varies from that in *my* to that in *body;* in Dutch, on the other hand, it always has the same full diphthongal sound as in the English *my*. In recent German writing it is the fashion to use it only in foreign proper names, *i* being substituted in such words as *bei* and *sein*, where it was formerly employed; and in recent Dutch writing *ij* is used instead of it, as *Bilderdijk* for *Bilderdyk*. In the Hungarian language, when occurring in a syllable after *g*, *l*, *n*, and *t*, it is pronounced much as in the English words *yes*, *year*, *gy* sounding like *dy* (nearly as *di* in *soldier*), *ly* like the French *l mouillé*, and *ny* like the Spanish *ñ*. In Latin it is used as a small letter only, and never as a capital; while in Spanish manuscript the capital Y is used instead of I.—Y has been called the Pythagorean letter, because Pythagoras used its Greek original to represent the sacred triad, formed by the duad proceeding from the monad, and also the dividing of the paths of vice and virtue in the development of human life.

YACHT (Dutch, *jagt;* Ger. *Jacht*, from *jagen*, to chase), a vessel for excursions of pleasure. The prophet Ezekiel referred to pleasure galleys of Tyre when he spoke of "thy benches of ivory," the "fine linen with broidered work from Egypt which thou spreadest forth to be thy sail," and the "blue and purple from the isles of Elishah which covered thee." Caligula's yacht was of costly cedar, the stern studded with jewels and the decks inlaid.—Yacht clubs are associations to promote yachting. The oldest of these was organized more than a century ago; but it is only within the last 50 years that they have obtained the prominence which has caused the more important to be recognized and fostered by government through peculiar privileges. These consist of exemption from port charges and light dues, and comparative independence from custom-house formalities. The United States, the United Kingdom and several of its colonies, Holland, France, Belgium, and Russia have their clubs. The first of these was started in Ireland in 1720 as "the Cork Harbor Water Club," and is now called the "Royal Cork Yacht Club." Its commanding officer is styled admiral, though most clubs call him commodore, while in the *yacht club de France* he is called president. Among the many clubs in Great Britain with the prefix "royal" are the following: The royal yacht club, founded in June, 1815; royal Victoria yacht club, May 24, 1845; royal Mersey yacht club, Liverpool, 1844. It was a yacht of the last named club, the Queen of the Ocean, Commodore Littledale, that saved the lives of 32 of the passengers and crew of the emigrant ship Ocean Monarch of Boston, burned Aug. 24, 1848, in Abergele bay. In Great Britain during summer regattas are frequent, the sea bordering the coast and the few navigable rivers and inlets being alive with fleets of pleasure vessels. Yet the English yachtsmen were beaten at the Cowes regatta of 1851, when the schooner America, of the New York squadron, won the first prize, the queen's cup, in a match open to all nations. The practice of lacing the mainsail in cutters and schooners to the mainboom, universal in the United States, was scarcely known in England at that time, though it undoubtedly facilitates a closer hugging of the wind by offering to it a flatter surface. As a general rule, English yachts are deeper and draw more water than American, and the centre board or sliding keel is not in use among them; but they are for the most part excellent sea boats. In 1875 the number of British yachts was 1,764, of which 610 measured 10 tons or less, 913 between 10 and 100 tons, 147 between 100 and

200, 51 between 200 and 300, 19 between 300 and 400, 3 between 500 and 600, and one each of 606 and 730 tons. The larger of these are steamers, the number of steam yachts having greatly increased since 1870.—The first yacht club in the United States was organized in 1844 at New York, with nine members and as many yachts. The late John C. Stevens was the first commodore. By 1845 the club numbered 17 yachts and 171 members, and a commodious club house was provided by the commodore at the Elysian Fields near Hoboken, on the Hudson. The first regular regatta in the United States took place in New York harbor, July 17, 1845. The course was from Robbin's reef around the southwest spit buoy to the light ship, and return. Seven schooners and three sloops took part, the Cygnet being the winner. Since then the regattas have taken place annually with one exception (the first year of the civil war), and the regatta day of the New York yacht club is one of the important aquatic events of the year. Newport, R. I., is the favorite resort of all yachtsmen. The first match race between yachts ever sailed in the United States took place on Oct. 10, 1846, the course being 25 m. to the windward and return, from the light ship off Sandy Hook. The contestants were the sloop Maria, 154 tons, owned by John C. Stevens, and the schooner Coquette, 74 tons, owned by J. H. Perkins, stakes $500 a side. The Coquette was the winner. The appearance of the new sloop Maria did much for the success of yachting. Since then numerous contests have occurred. In June, 1858, the course was round Long Island, for a sweepstakes of $800. Races from Sandy Hook light ship, to and around Cape May light ship and back, were inaugurated in September, 1865. Since the America's visit to Europe in 1851, 14 American yachts have crossed and recrossed the ocean. Of these trips, the race between the Henrietta, Fleetwing, and Vesta in 1866, from Sandy Hook to Cowes, is the most memorable. It was for a sweepstakes of $90,000, and was won by the Henrietta, she making the run in 13 d. 21 h. 55 min. English yachtsmen have also visited this country in their vessels. Prominent among them is James Ashbury, who in 1870 and again in 1871 entered the port of New York in the schooner yachts Cambria and Livonia, as representative of his countrymen to win back the queen's cup. In the visit of the Cambria she sailed a match race with Mr. James Gordon Bennett's schooner yacht Dauntless from Queenstown, beating the latter to Sandy Hook about one hour, a contest which has no parallel. The races that followed the arrival of the English boats were among the most important yachting events on record, and the victories of the Americans were very decided. Among the remarkable runs made by the modern yacht is that of the sloop Magic in the first race for the queen's cup, New York harbor, Aug. 8, 1870. She went over the course, about 43 m., in the actual sailing time of 4 h. 7 min. 54 sec. This was from an anchorage off Stapleton, Staten Island, around the southwest spit to Sandy Hook light ship, and return. In the annual regatta of the New York yacht club, June 6, 1873, the schooner Madeleine, with a flying start, made the run from a point abreast of Forts Wadsworth and Lafayette, over the regular course, about 40 m., in 4 h. 1 min. 20 sec. In the last trip across the Atlantic, from New York to Cowes, the schooner Sappho, on April 28, 1872, when three days out, in a westerly gale, and with canvas reduced to a three-reef foresail, made the run of 318 m. in 24 hours. Yachting has greatly increased within the last quarter of a century over the whole United States; and in all cities with sufficient water there are prosperous clubs. In 1875 there were 34 regularly organized clubs, most of them incorporated, with a registry of 692 vessels, of which 116 were schooners, 394 sloops, 3 cutters, 145 cat-rigged, and 34 steamers. The keel boats in this list number 171. The New York club in 1875 registered 38 schooners, representing 5,566 tons; 27 sloops, 924 tons; and 13 steamers, 1,000 tons. As representative craft of the New York club, may be instanced the Sappho, keel (sold into a foreign club, December, 1875), and the Mohawk, centre-board. They are the largest of their respective classes afloat. The Sappho is 133 ft. 9 in. on deck, 120 ft. on the water line, 108 ft. on keel, 27 ft. beam, 10 ft. hold, and 12 ft. 6 in. draught of water, and measures 310 tons. The Mohawk is 117 ft. 6 in. length of keel, 121 ft. on the water line, 144 ft. on deck, and 150 ft. over all, 30 ft. 4 in. beam, and 9 ft. 4 in. depth of hold; length of centre board, 30 ft.; draught of water, 6 ft. She has 18 ft. overhang and 14 ft. rake of stem, measures 330 tons, and is fitted out with 32,235 sq. ft. of canvas. The schooners are almost universally fore-and-aft rigged, *i. e.*, not carrying square topsail yards on the foremast. The cutter differs from the American sloop in carrying a sail, termed the foresail, on a stay from the masthead to the stem, the jib and flying jib being set on a long running bowsprit. The cutter in fact substitutes two head sails for one used in the sloop. The yawl differs from the cutter in carrying a slightly reduced mast and boom, the latter leaving room for a small aftermast stepped close astern, whereon to set a lugsail sheeted home to the end of a running boom. —By acts of congress, Aug. 7, 1848, and June 29, 1870, yachts are licensed on terms which authorize them to go from port to port of the United States, and by sea to foreign ports, without entering or clearing at the custom house; and yachts belonging to a regularly organized yacht club of any foreign nation which extends like privileges to the yachts of the United States, have the privilege of entering any port of the United States, without entering or clearing at the custom house, or paying tonnage tax. But yachts, like coasting vessels, and under the same penalties, are prohibited from going to a foreign port with such papers only. A yacht belonging to an incorporated or organized club may be sent abroad without taking out an ordinary certificate of registry; but in such cases special application must be made to the treasury department, through a collector of customs, for a commission. This is in the nature of a sea letter, or passport, as evidence of the nationality of the vessel. A treasury circular dated Dec. 5, 1874, gives the following rules relating to the lights to be carried by yachts, and no others shall be carried, in all weathers, between sunset and sunrise while under way or being towed: on the starboard side, a green light, of such a character as to be visible on a dark night, with a clear atmosphere, at a distance of at least two miles, so constructed as to show uniform and unbroken light over an arc of the horizon of ten points of the compass, and so fixed as to throw the light ahead two points abaft the beam on the starboard side; on the port side, a red light, of the same character and in all respects similar to the starboard light, and so fixed as to throw it two points abaft the beam on the port side. The green and red lights shall be fitted with inboard screens, projecting at least three feet forward from the lights, so as to prevent them from being seen across the bow.

YADKIN, a river of North Carolina, which rises at the foot of the Blue Ridge in Caldwell co., and runs E. to Stokes co., whence it flows S. S. E. into South Carolina, where it receives the name of Great Pedee. (See PEDEE, GREAT.) In North Carolina it receives several affluents, the most considerable of which are Rocky river and Abbot's creek. Its descent is rapid, and it is often obstructed by shoals.

YADKIN, a N. W. county of North Carolina, bounded N. and E. by the Yadkin river; area, 310 sq. m.; pop. in 1870, 10,697, of whom 1,444 were colored. It has a diversified surface and a productive soil. Iron ore is found. The chief productions in 1870 were 42,109 bushels of wheat, 223,856 of Indian corn, 63,159 of oats, 12,172 of Irish and 10,139 of sweet potatoes, 63,389 lbs. of butter, 11,123 of wool, 98,493 of tobacco, and 884 tons of hay. There were 1,435 horses, 2,283 milch cows, 2,995 other cattle, 5,941 sheep, and 12,682 swine. Capital, Yadkinville.

YAK (*poëphagus grunniens*, Gray), an animal of the ox tribe, inhabiting the mountains of Thibet and central Asia. The wild yak is larger than domestic cattle, generally black, and characterized by a thick fringe of long hair hanging from the lower part of the body nearly to the ground; the general covering is long, thick, and soft, the head short, horns round and smooth, ears, nose, and nostrils small, forehead apparently prominent on account of the curling hair, eyes large and full, neck short, shoulders high and arched, rump low, and legs very short; the hair of the tail is long and fine as in the horse; they seem heavier than they really are, and have rather a downcast, sullen, and suspicious look; they are found only near the line of perpetual snow. The domesticated yak is nearly 4 ft. high at the shoulders, and 7 ft. long from nose to tail; they vary in size and color, probably from intermixture with common cattle, but have the fringe on the lower parts; they make a grunting noise, whence the specific name. They are strong and sure-footed, and are used in agriculture and as beasts of burden; tents and ropes are made of the hair, and caps and jackets of the skins; the milk is rich and the butter excellent; the latter is kept in skins and bladders for a year, and forms an important article of merchandise. Their tails are esteemed in India as brushes for driving off flies and other insects from men, horses, and elephants; they are often set in costly handles, and are called chowries; the Chinese dye them red, and wear them in their hats. Those with white tails are most esteemed, and the horns are sometimes as white as ivory.

Yak (Poëphagus grunniens).

YAKIMA, a S. county of Washington territory, on the E. slope of the Cascade mountains and extending into the valley of the Columbia; area, about 5,000 sq. m.; pop. in 1870, 432. It embraces the valley of the Yakima river, and contains excellent grazing lands, fertile and productive tracts, and abundant timber. The chief productions in 1870 were 1,250 bushels of wheat, 1,270 of oats, 3,973 lbs. of wool, and 513 tons of hay. There were 429 horses, 104 mules and asses, 1,621 milch cows, 2,547 other cattle, 1,361 sheep, and 87 swine. Capital, Yakima City.

YAKUTSK. **I.** A province of E. Siberia, bounded N. by the Arctic ocean, E. and S. E. by the Littoral province, S. by the Amoor and the Transbaikal provinces, S. W. by the government of Irkutsk, and W. by that of Yeniseisk; area, 1,517,077 sq. m.; pop. in 1870, 231,977. The coast, which is deeply indented, is a dreary region of frozen plains and swamps, called the *tundra*, covered with moss, on which reindeer feed. It abounds in fossil remains, and the tusks of mammoths washed out by the rivers furnish great quantities of ivory. The sea is frozen more than half the year, and is never free from floating ice even in summer. The interior is an undulating plain traversed by spurs from the Yablonnoi and Stanovoi mountain ranges, which bound the province on the south and southeast. Through the valleys formed by these spurs flow many large rivers, the principal one of which, the Lena, is the chief avenue of commerce. Other rivers are the Olem, Olenek, Yana, Indigirka, Alazeya, and Kolyma. The climate is severe. The mean temperature of July, the warmest month, is 66° in the central districts, but in January the thermometer falls 60° to 70° below zero. The earth is frozen 600 ft. deep, and frost is always to be found three or four feet below the surface in the warmest weather. Notwithstanding the shortness of the season, the cereals thrive, and cabbages, potatoes, turnips, and berries are raised. For the fauna, flora, and native tribes, see SIBERIA. Yakutsk is divided into the districts of Yakutsk, Olekminsk, Viluisk, Verkhoyansk, and Kolymsk. **II.** A city, capital of the province, on the left bank of the Lena, about 500 m. W. N. W. of Okhotsk; lat. 62° 2′ N., lon. 129° 44′ E.; pop. about 6,500. It stands on a plain overlooked by lofty hills, and has straight unpaved streets, a cathedral and several other churches, and a stone market place. It is the principal trade centre for E. Siberia, and the traffic in furs and provisions is important. Chinese and European goods, brought down the Lena from Irkutsk, are sent thence by caravans over the mountains to Okhotsk. The Russian-American company has an establishment here, and a fair is held throughout the month of July.

YALE, Elihu, the early patron of Yale college, born in New Haven, Conn., April 5, 1648, died in London, July 22, 1721. His father, Thomas Yale, came to New Haven with the first English colonists in 1638, but returned in 1658 with his family. The son never revisited America. About 1678 he went to the East Indies, and from 1687 to 1692 was governor of Fort St. George, Madras. Afterward, having returned to England, he was chosen governor of the East India company, and a little later a fellow of the royal society. In Collins's "Peerage" he is said to have caused the first sale by auction in England. The amount of his gifts to the institution which afterward received his name, in books and money, at different times from 1714 to 1721, was estimated at £500; but the timeliness even more than the amount of his aid made it of great value. In recognition of his generosity, the trustees in 1718 named the new collegiate house at New Haven Yale college; and this designation, limited at first to the edifice, was in the charter of 1745 applied to the whole institution. A summary of what is known of his life is given in the "Yale Literary Magazine," April, 1858.

YALE COLLEGE, one of the oldest and largest of American colleges, situated in New Haven, Conn. The design of founding a college in New Haven was formed by the planters soon after the settlement of the town, but in 1652 it was voted to be "too great a charge for us of this jurisdiction to undergo alone." It was agreed, however, that if the Connecticut colony would assist, New Haven would bear its just proportion of the expense of erecting and maintaining a college in that town. But in consequence of remonstrances from the people of Massachusetts, who argued that the whole population of the colonies was scarcely sufficient to support one such institution, and that the establishment of a second would result in the sacrifice of both, the project was abandoned for the time, and the colony continued to make its annual appropriation to the support of Harvard college. In 1698 it was renewed, and a proposition was made to found a "school of the church," to be supported by contributions from the several Congregational churches. In 1699 ten of the principal clergymen were nominated as trustees to found a college. These held a meeting for organization at New Haven in 1700, and formed a society to consist of eleven ministers including a rector. They soon after met again in Branford, when each presented several books for the library, saying as he made the gift: "I give these books for founding a college in Connecticut." The general assembly granted a charter on Oct. 9, 1701, for a "collegiate school in his majesty's colony of Connecticut," and on Nov. 11 the trustees met at Saybrook, which town they selected as the "most convenient place at present" for the college, and elected the Rev. Abraham Pierson of Killingworth as rector. The first student was Jacob Hemingway, who continued alone under the instruction of the rector from March to September, 1702, when the number of students was increased to eight, and a tutor was chosen. The first commencement was held on Sept. 13, 1702, at which four graduates of Harvard and one privately educated person received the degree of A. M. Rector Pierson, who never removed his residence to Saybrook, died in 1707, and the Rev. Samuel Andrew of Milford was appointed rector *pro tempore.* After this the senior class recited to him at Milford, while the lower classes remained at Saybrook in charge of two tutors. In the diplomas given at Saybrook the college is styled *gymnasium academicum.* Complaint having been made of the inconvenience of the site, the trustees voted in 1716 to establish the college permanently at New Haven, and soon after the first building was begun. This was finished in 1718, and at the first commencement in New Haven, held on Sept. 12 of that year, it was named Yale college in honor of Elihu Yale, who had begun a short time before to make his donations. The name was at first confined to this building, but in 1745, when a new charter was granted to the college, it was applied authoritatively to the whole institution. In 1748 the laws of the college, founded partly upon those of Harvard and partly upon the Oxford statutes, were printed in Latin; and this was the first book printed in New Haven. It was published first in English in 1772. At Saybrook the course of study had been limited to Latin, Greek, Hebrew, logic, metaphysics, theology, and physics; but after the removal to New Haven the curriculum was enlarged, especially in mathematics. Up to 1755 the instruction was given entirely by the rector and tutors, but in that year a professor of divinity was chosen. A chair of mathematics, natural philosophy, and astronomy was established in 1770; and in 1802 was founded a professorship of chemistry, mineralogy, and geology, and in 1805 one of Hebrew, Greek, and Latin. Since then the corps of instructors has gradually increased, until now (1876) the college has in its several departments nearly 100 professors and assistants. The other faculties, as now constituted, were organized as follows: medicine, 1812; theology, 1822; law, 1824; philosophy, 1847. The government of the college was administered by the president and 10 fellows, all of whom were clergymen, till 1792, when, in consideration of certain grants from the state, the corporation voted that the governor, lieutenant governor, and six senior assistants in the council (called senators under the constitution) should become fellows, thus making the corporation to consist of 18 members besides the president. In 1871–'2 the legislature passed an act providing for the substitution of six graduates of the college as members of the corporation in place of the six senior senators. These six fellows, to be elected by the alumni, were so divided that one vacancy in their number should occur each year; and this annual vacancy is now filled by the election of a graduate to serve for six years. All the departments of the university are subject to the corporation, the legal title of which is "the President and Fellows of Yale College in New Haven;" but the immediate government is vested in the president and professors, who constitute the faculty. The president is *ex officio* head of each department, but each is practically independent in its internal management, and has as its executive officer a dean, director, or chairman. The university alone has the power to confer degrees. Yale college has had ten rectors and presidents, whose names and terms of service, and the number of classes and total number of students graduated under each down to 1874, are given in the following table:

PRESIDENTS.	Years.	Classes.	Graduates.
Abraham Pierson.............	1701–1707	5	16
Samuel Andrew (*pro tempore*)	1707–1719	12	60
Timothy Cutler...............	1719–1722	4	36
Samuel Andrew (*pro tempore*)	1722–1725	2	29
Elisha Williams...............	1725–1739	15	247
Thomas Clap.................	1739–1766	27	757
Naphtali Daggett............	1766–1777	11	330
Ezra Stiles.............. ...	1777–1795	17	636
Timothy Dwight..............	1795–1817	22	1,109
Jeremiah Day................	1817–1846	30	2,342
Theodore Dwight Woolsey....	1846–1871	25	2,546
Noah Porter..................	1871	3	356
Total number of graduates	....	..	8,464
Deceased in 1874..........	....	..	4,606
Total living graduates in 1874.....................	....	..	3,858

—The principal buildings of Yale college occupy a square of about nine acres, N. W. of the public green. The main academical buildings are the "old brick row," fronting on College street, consisting of South college (built in 1794), the Athenæum (1763), South Middle college (1752), the lyceum (1803), North Middle college (1803), the chapel (1824), and North college (1821). Divinity college (1836) was demolished in 1870 to make room for Durfee hall. Behind the principal row are the laboratory (1782), the college cabinet (1819), and the old Trumbull gallery, erected in 1832 for the collection of pictures left to the college by Col. John Trumbull, which were removed to the art building in 1868. On the W. side of the square is the library (1844), a fine Gothic structure of Portland sandstone. On the N. corner is Alumni hall (1853), used for the annual examinations and graduates' meetings. The school of fine arts (1866), the most elaborate of all the buildings, occupies the W. cor-

The Library.

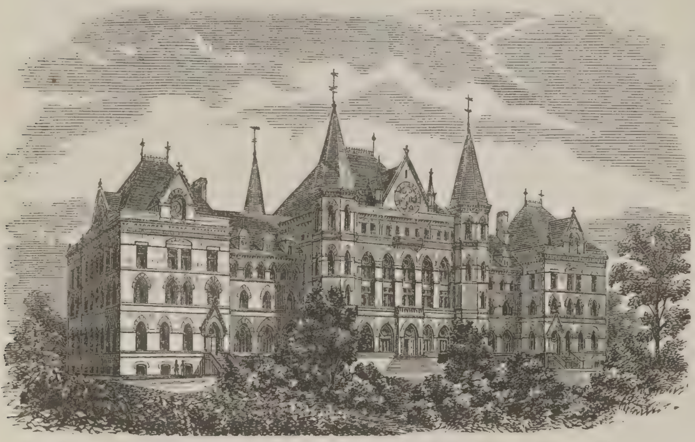
ner of the square. It cost more than $175,000, and was presented to the college by Augustus Russell Street. Near it is the bronze statue of Rector Pierson, by Launt Thompson, erected in 1874. On the E. corner of the quadrangle is the new chapel (1875), a cruciform building of New Jersey sandstone, with a rounded apse at the E. end of the nave. It will seat 1,050 persons. This and the dormitories named Farnam and Durfee halls, which adjoin it, constitute a part of the new structures intended to surround the quadrangle. Farnam hall (1870) is of brick and blue stone, and Durfee hall (1871) of New Jersey sandstone. Of the buildings off the main square, the new divinity colleges, called East (1870) and West (1874) Divinity halls, furnish, besides class rooms, apartments for 150 students. The Marquand chapel (1870), connected with the East hall, will seat 250 persons. The buildings of the Sheffield scientific school, called respectively Sheffield and North Sheffield hall, and of the medical school, are conveniently situated and well adapted for their purposes. The law school occupies the entire third story of the county court house.—The departments of instruction are comprehended under four divisions or faculties, as follows: philosophy and the arts, theology, law, and medicine. Under the first are included the undergraduate academical department, the undergraduate section of the Sheffield scientific school, the courses for graduate instruction in both of these departments, and the school of the fine arts. Applicants for admission to the undergraduate academical department must be at least 16 years of age, and are required to pass an examination in Latin grammar, Sallust, Cicero, Virgil, and Latin prose composition; Greek grammar, Xenophon, Homer, and Greek history; higher arithmetic, algebra, and the first two books of Euclid; English grammar and geography; and the elements of the French or German language. The course of instruction occupies four years. Each year is divided into three terms: the first term begins 11 weeks from commencement, which is held on the Thursday after the last Wednesday in June, and continues 14 weeks; the second begins on the first Thursday in January and continues 13 weeks; and the third begins 10 weeks before commencement. The faculty of this department consists of professors of moral philosophy and metaphysics, of natural philosophy and astronomy, of geology and mineralogy, of Latin, of mathematics, of Greek, of rhetoric and English literature, of history, of chemistry and molecular physics, of modern languages, of German, and of political and social science; three assistant professors, in mathematics, Latin, and English literature; and two tutors. Instruction is partly by text books and partly by lectures. Public examinations are held at the close of the first and second terms, and at the close of the year on all the studies of the year. The annual charge for tuition, room rent, and incidentals is $140. The necessary annual expenses for board and instruction are from $375 to $650. Provision is made for the education without charge of about 100 indigent students, and there are 24 scholarships, yielding $60 to $100 a year, which are bestowed on deserving students of small means. The academical department has two fellowships, the Douglas and the soldiers' memorial, each having an income of about $600, which are bestowed upon recent graduates who shall reside in New Haven pursuing non-professional studies. The first may not be held more than three years by any one incumbent, and the second not more than five years. The Berkeley, Clark, Bristed, and Woolsey scholarships, yielding from $46 to $120 a year, and many prizes, from $10 to $250 a year, are given to successful students. The degree of bachelor of arts is conferred on those who have completed the course, and the degree of master of arts on bachelors of arts of two years' standing, who give evidence on examination, after one year's non-professional study in New Haven, of having made further satisfactory progress in liberal studies, or on bachelors of arts of three years' standing who may prosecute their studies elsewhere, and may give evidence by their printed writings or on examination that they are worthy of the degree. The course for graduate instruction in this department embraces three groups of studies. The first group comprises political science, history, philosophy, and English literature; the second, philology, including instruction in Sanskrit, Hebrew and the other Semitic languages, the elements of the Chinese and Japanese languages, Anglo-Saxon and the early forms of English, old French and Provençal, the older Germanic languages and literature, the American Indian languages, and in special Latin and Greek authors; the third, the mathematical and physical sciences. The terms correspond with those of the undergraduate department, and the course of study occupies two years. The fees are from $100 to $150 a year. The degree of doctor of philosophy is conferred on those who have fulfilled the requirements of the course.—The Sheffield scientific school, which is partly analogous to the academical department and partly to the professional schools, was founded in 1847, but did not take its present name till 1860, when it was reorganized and placed upon a firm foundation through the munificence of Joseph E. Sheffield of New Haven, whose gifts to the school have exceeded $350,000. In 1864 it received the avails ($135,000) of the national land grant of 1862, and thus became the college of agriculture and mechanic arts for Connecticut. The faculty consists of 16 professors and 13 instructors and assistants. Candidates for admission must be not less than 16 years of age, and must pass an examination in English grammar, history of the United States, geography, Latin, arithmetic, algebra, plane

Sheffield Hall.

East and West Divinity Colleges and Marquand Chapel.

trigonometry, and elementary natural philosophy. The course of instruction occupies three years. The first year's study is the same for all, and comprises German, English language and composition, mathematics, physics, chemistry, drawing, physical geography, botany, and political economy. During the last two years the instruction is arranged in special courses, to suit the requirements of different classes of students, as follows: 1, chemistry; 2, civil engineering; 3, dynamic engineering; 4, agriculture; 5, natural history; 6, studies preparatory to a medical course; 7, studies preparatory to mining and metallurgy; 8, select studies preparatory to other higher studies. Lectures on military science and tactics are also given. The terms correspond with those of the academical department. The degree of bachelor of philosophy is conferred on graduates, and those of civil and dynamic engineer on bachelors who pursue a further course of two years' study. The degree of doctor of philosophy is also open to those who pursue a less practical graduate course under conditions similar to those required in the graduate academical course. The graduate courses of the scientific school are more particularly designed for special professional training in the physical sciences and their applications. The charge for tuition in the undergraduate department is $150 a year; in the special course in chemistry there is an additional charge of $70 for chemicals and use of apparatus; and there are also several minor charges.—The school of fine arts affords thorough technical instruction in drawing and painting, together with a knowledge of the history and criticism of art by lectures. It is designed to embrace a similar course in architecture, sculpture, and anatomy, but those chairs are not yet filled. The present faculty consists of professors of painting, of the history of art, and of drawing, and an instructor in perspective. The collections embrace the Jarves gallery of Italian art, consisting of 120 paintings of the Italian school dating from the 11th to the 17th century; the Trumbull gallery of 54 pictures, comprising most of the originals of Trumbull's pictures of the revolution; a collection of about 75 pieces of contemporaneous art; and many casts from the antique. The terms for instruction are $36 a quarter. The school is open to both sexes, but none are admitted who are less than 15 years of age.—The faculty of the department of theology consists of a lecturer on church polity and American church history, and professors of systematic theology, of Hebrew literature and Biblical theology, of homiletics and the pastoral charge, of ecclesiastical history, and of sacred literature. The course of instruction occupies three years, called respectively the junior, middle, and senior year. There is but one term in each year, beginning on the second Thursday in September and ending on the second Thursday in May. Students are licensed to preach after the second year. All members who pass the prescribed examination at the end of the senior year, and present an approved thesis on some topic in theology, receive the degree of bachelor of divinity. The reference library of the seminary contains 2,000 volumes; the Lowell Mason library of church music, one of the largest in the country, is also in the seminary. No charge is made for instruction, room rent, or use of library, and indigent students receive $100 a year from the income of scholarships and other funds. In special cases additional aid is given. There are 18 scholarships belonging to the seminary.—The faculty of the law school consists of professors of mercantile law and evidence, of elementary and criminal law and the law of real property, of constitutional law, contracts, and wills, and of pleading and equity jurisprudence. The course of study includes also lectures on life insurance, international law, ecclesiastical law, forensic composition, English constitutional law and history, medical jurisprudence, forensic elocution, Roman law, and patent law. There are two terms in each year, a fall term beginning with the first academical term and ending the day before Christmas, and a spring term beginning on the second Wednesday of February and ending at commencement. The students are divided into two classes, senior and junior, each of which has a special course of study. A course is also provided for those who desire to study law with reference to commercial pursuits. The library contains 7,000 volumes, and a fund is provided to furnish all the current reports and legal periodicals. The degree of LL. B. is conferred, after examination, on attorneys at law who have studied two terms in the department, on bachelors of arts, science, or philosophy, who have studied three terms, and on other students who have studied four terms. The fees are $90 for the annual session, and $5 for a diploma.—The faculty of the medical department consists of professors of chemistry and toxicology, of obstetrics and the diseases of women and children, of materia medica and therapeutics, of histology, pathology, and microscopy, of the theory and practice of medicine, of surgery, of general and special anatomy and physiology, and a lecturer on insanity. The course is divided into two terms in each year, a winter term beginning on the second Thursday in October and ending on the second Thursday in February, and a spring term beginning on the first Thursday in March and ending at commencement. The first year is devoted to elementary and the second to practical branches. Provision is made for a third year's study, to review the studies of the course, with the addition of advanced courses of reading. A surgical clinic is held every Wednesday at 12 M., and a medical clinic every Friday at 3 P. M. The museum contains a large collection of natural and morbid specimens, as well as casts, models, and plates. The degree of M. D. is conferred, on satisfactory examination, upon candidates 21 years of age, who have studied medicine for two years if graduates of a college, and three years if not graduates. The matriculation fee is $5; winter term fee, $105; spring term fee, $60; laboratory fee, $10; demonstrator's ticket, paid by those who dissect, $5; and graduation fee, $25.—The library, originally founded with 40 volumes, soon received valuable gifts of books from Sir John Davie of Groton, Jeremiah Dummer, colonial agent in London, in behalf of himself and others, Elihu Yale, and Francis Nicholson. In December, 1718, it was removed to New Haven, when 250 volumes were lost in consequence of the violent opposition of the people of Saybrook to its transfer. The most valuable gift of the last century was that of Bishop Berkeley, who in 1730 sent it 1,000 volumes. In 1800 it contained about 3,500 volumes, in 1830 about 10,000, and in 1860 about 45,000; it now (1876) comprises 76,000 volumes. Besides the college library proper, there are the libraries of the professional schools, which contain in the aggregate 17,000 volumes, and the consolidated Linonian and Brothers society library of 19,000 volumes; total of university libraries, exclusive of pamphlets, 112,000 volumes. The museum of natural history, endowed in 1866 with $150,000 by George Peabody, has now become an important adjunct of the college. A fire-proof building has been erected on the square W. of the college square, and in it will soon be arranged the geological and mineralogical cabinet, and the specimens illustrative of zoölogy, palæontology, and

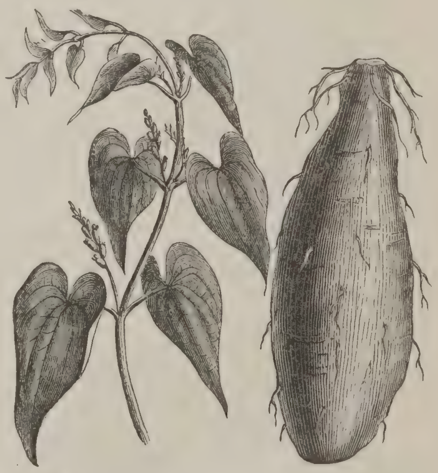
American archæology. These collections have been largely increased during the past few years by the annual expeditions to the west led by Prof. Marsh, and by the explorations on the coast under Prof. Verrill. The present building will be but one wing of a much larger structure.—Yale college has received but little aid from the state, and has depended mostly on the revenue derived from students and the gifts of individuals. According to the treasurer's report for the year ending April 30, 1875, the total invested fund of the college amounted to about $1,550,000; the total income for the same year was $235,465, of which $107,000 was derived from term bills of students. No estimate is given of the value of grounds, buildings, libraries, collections, apparatus, &c. Previous to 1875 the college had conferred 10,605 degrees, of which 870 were honorary. In 1875–'6 the number of pupils in each department, according to the annual catalogue, was as follows: undergraduate academical students, 582; Sheffield school, 224; graduate and special students, 63; theological department, 99; law department, 76; medical department, 42; total, 1,086; deduct for names inserted twice, 35; total number of students in the college, 1,051. The "Yale Literary Magazine," a monthly periodical, begun in 1838, and two weekly newspapers, begun in 1855 and 1872 respectively, are published by the students.



Peabody Museum.

YALOBUSHA, a N. county of Mississippi, watered by tributaries of the Yalobusha and Tallahatchie rivers; area, 450 sq. m.; pop. in 1870, 13,254, of whom 7,052 were colored. The surface is generally level and the soil highly fertile. It is intersected by the Mississippi Central and the Mississippi and Tennessee railroads. The chief productions in 1870 were 241,138 bushels of Indian corn, 3,772 of Irish and 11,880 of sweet potatoes, 5,961 lbs. of butter, and 5,167 bales of cotton. There were 841 horses, 1,146 mules and asses, 1,851 milch cows, 3,821 other cattle, 3,002 sheep, and 8,232 swine; 1 manufactory of agricultural implements, 1 of sash, doors, and blinds, 1 of cars, 2 of iron castings, 5 flour mills, 4 saw mills, and 2 railroad repair shops. Capital, Coffeeville.

YAM, the popular name for plants of the genus *Dioscoræa* (named in honor of the Greek naturalist Dioscorides), and in the southern states applied very generally to light-colored varieties of the sweet potato. (See POTATO, SWEET.) It is the type and most important genus of a small order of endogenous plants, the *Dioscoræaceæ*, or yam family, mostly tropical, with large tuberous or knotted roots, twining stems, and small diœcious flowers; another genus is described under TORTOISE PLANT, and the engraving there given illustrates the general appearance of the yams as to vine and foliage. The leaves in *Dioscoræa* are petioled, alternate, but sometimes opposite, and netted-veined; the flowers are in small axillary racemes or panicles, the sterile consisting of a six-parted perianth with as many stamens; the fertile of a three-celled ovary surmounted by a perianth, and three styles, and ripening into a three-winged, three-celled pod, which when ripe splits through the wings to liberate the one or few seeds contained in each cell. Though generally tropical, one species, *D. villosa*, the wild yam, is found as far north



Yam (Dioscoræa alata).

as New England, and is very common southward; it grows in thickets, running over bushes, and is conspicuous in the autumn by its large clusters of pods, which are much in request for skeletonizing and for winter bouquets; though called *D. villosa*, the plant is usually nearly smooth, or at most the leaves are slightly downy below. The leaves, commonly alternate, are sometimes opposite, and even in fours, heart-shaped at base, conspicuously pointed at the apex, and with 9 to 11 strong ribs; flowers greenish yellow. On account of its pleasing, dense foliage, this is sometimes cultivated to cover low screens and arbors. The yams cultivated in tropical countries, and occasionally as a curiosity in the southern states, all form very large, thick, tuberous roots, differing in size, shape, and color; they sometimes weigh 30 or 40 lbs., and are irregular shapeless masses, or turnip-shaped and 3 ft. or more long; some are white and others purplish throughout, and the skin is of various shades from whitish to nearly black. There are many varieties, derived from *D. sativa*, *D. alata*, *D. aculeata*, and several others, all natives of the East Indies; having been long cultivated in the West Indies and South America, some have become naturalized in those countries, in which there are also several native species. The roots contain a large amount of starch, about 25 per cent. in some, but they are rather coarse, and are not generally esteemed by Europeans; they are eaten either roasted or boiled, and a meal is prepared from them for use in puddings and cakes. Occasionally the roots are imported, chiefly as an attractive curiosity at the West India fruit stores. When the rot, about 1845, threatened the extermination of the potato, a general search was made for some edible tuber or root that would serve as a substitute; among those proposed, none were more prominent than the Chinese yam (*D. batatas*, or *D. Japonica* of some), which had been long in cultivation in China and Japan, and which was introduced into Europe by the French consul at Shanghai, and soon after was brought to this country, where for a while it created much interest. It forms a long club-shaped root, 2 ft. or more long, and largest at the lower end; the vines run from 10 to 20 ft. in length, and have rich, dark green, heart-shaped leaves, in the axils of which are produced bulblets smaller than an ordinary pea, from which, or from cuttings of the upper portion of the root, the plant is propagated. The root is remarkably white within, rather mucilaginous, and when cooked is much esteemed by many, but, lacking the dry starchy character of the potato, not likely to be generally popular; it is boiled, roasted, or fried. The great obstacle to its general cultivation is the difficulty of taking the crop; the depth to which the roots go perpendicularly downward makes the digging of them very expensive; their shape, being largest below, renders it impossible to pull them, and their extreme brittleness makes it exceedingly difficult to extract them without breaking. The plant is perfectly hardy, and the roots remain in the ground during the severest winters without injury. Its cultivation is now confined to amateurs who are willing to be at the trouble of digging the roots, and it is sometimes seen growing as an ornamental vine; animals are fond of the herbage, and it has been proposed in France to grow it as a forage plant, sowing the bulblets broadcast. A variety or species, Decaisne's yam (*D. Decaisneana*), has been recently introduced into France; its roots are inferior in quality to the preceding, and not so large as an ordinary potato.

Chinese Yam (Dioscoræa batatas).

YAMASKA, a S. county of Quebec, Canada, on the S. bank of the St. Lawrence, where it expands into Lake St. Peter; area, 261 sq. m.; pop. in 1871, 16,317, of whom 15,800 were of French origin or descent. It is drained by the Nicolet river, and by the St. Francis and Yamaska, which here empty into the St. Lawrence. Capital, St. François.

YAMHILL, a N. W. county of Oregon, bounded E. by the Willamette river, bordering W. on the Coast mountains, and intersected by the Yamhill river; area, 750 sq. m.; pop. in 1870, 5,012; in 1875, 5,447. The surface is undulating, and the soil, particularly in the east, fertile. It is traversed by the Oregon Central railroad. The chief productions in 1870 were 374,898 bushels of wheat, 219,939 of oats, 11,627 of barley, 31,610 of potatoes, 65,100 lbs. of wool, 103,162 of butter, and 7,261 tons of hay. There were 4,202 horses, 6,100 cattle, 18,851 sheep, and 13,602 swine; 8 flour mills, and 4 saw mills. Capital, Lafayette.

YANCEY, a N. W. county of North Carolina, bordering on Tennessee, and bounded N. by the Nolichucky river; area, about 600 sq. m.; pop. in 1870, 5,909, of whom 308 were colored. The surface is mountainous, and lies between Iron mountain and the Blue Ridge. Mt. Mitchell, in the S. E. part, is about 6,500 ft. above the level of the sea. The chief productions in 1870 were 20,514 bushels of wheat, 113,683 of Indian corn, 28,207 of oats, 2,727 lbs. of butter, 8,980 of wool, 5,211 of tobacco, and 511 tons of hay. There were 760 horses, 1,963 milch cows, 2,702 other cattle, 5,518 sheep, and 8,244 swine. Capital, Burnsville.

YANINA. See JANINA.

YANKEE, a familiar term applied in the United States to the inhabitants of the New England states, and after the outbreak of the civil war of 1861 employed by the inhabitants of the seceded states to designate those who remained loyal to the government. Foreigners have generally applied the term indiscriminately, and habitually in a disparaging sense, to all inhabitants of the United States. Of the many etymologies assigned to the word, the most probable is that of Heckewelder, viz.: that it is a corruption of the word English by the North American Indians, who pronounced it Yenghees or Yanghees.

YANKEE DOODLE, a tune that since the revolutionary war has been popular in the United States, and has become one of our national airs. It was known as long ago as the reign of Charles I., being then sung to the nursery rhyme "Lucy Lockit lost her pocket." In the time of Cromwell it was sung to the following rhyme, in which the words by which it is known first appear:

> "Yankee Doodle came to town
> Upon a Kentish pony;
> He stuck a feather in his hat,
> And called him Maccaroni."

It is supposed to have been written to satirize Cromwell. The tune was played by the British bands in colonial times, and during the American revolution various doggerel verses were sung to it, many of them in ridicule of the Americans. According to some authorities, it originated in a popular Dutch harvest song.

YANKTON, a S. E. county of Dakota, separated from Nebraska by the Missouri river, and intersected by the Dakota; area, about 520 sq. m.; pop. in 1870, 2,097. The Dakota Southern railroad terminates at the county seat. The river bottoms are very fertile. The chief productions in 1870 were 18,225 bushels of wheat, 8,855 of Indian corn, 15,075 of oats, 12,459 of potatoes, 7,000 lbs. of wool, 5,060 of butter, and 3,177 tons of hay. There were 348 horses, 479 milch cows, 1,315 other cattle, 965 sheep, and 288 swine. Capital, Yankton, which is also the capital of the territory.

YANKTON, a city and the capital of Dakota territory, county seat of Yankton co., on the N. bank of the Missouri river, 980 m. above its junction with the Mississippi, and 7 m. above the mouth of the Dakota, about 500 m. W. by N. of Chicago; lat. 42° 45′ N., lon. 97° 30′ W.; pop. in 1870, 737; in 1876, locally estimated at 3,600. It is beautifully situated on a smooth plateau, surrounded on the north and west by smooth high slopes. The river bank is here high and protected by stone. The site comprises about 800 acres. The streets cross each other at right angles, those running E. and W. being 80 ft. wide and those N. and S. 100 ft., except Broadway, which is 130 ft., and Douglas avenue, 120 ft. The buildings are chiefly of wood, but there are many brick and stone blocks and residences. The city is the W. terminus of the Dakota Southern railroad, which connects at Sioux City, Iowa, with lines for the east. The shipments of produce and receipts of lumber and farm machinery are important. It is the point of reshipment of government supplies for many military posts and Indian agencies on or near the river above. The Missouri river transportation company runs ten steamers of from 250 to 400 tons from this point during the season of navigation as far as Fort Benton, Montana. Yankton is also a depot of supplies for the Black hills. There are four large grain elevators, railroad machine shops, a foundery and machine shop, a tobacco and cigar factory, two breweries, two flouring mills, a national bank, two private banks, and two large hotels. The city has excellent free public schools, including a high school, with fine new buildings and an enrollment of more than 600 out of a school population (5 to 21 years) of 867. A daily and three weekly (one German) newspapers are published. The territorial library contains 2,100 volumes, that of the historical society 1,300, and the ladies' library 600. There are seven churches (Baptist, Congregational, Episcopal, Lutheran, Mennonite, Methodist, and Roman Catholic).—Yankton derives its name from the Yankton band of Sioux Indians, who formerly occupied the site as their council ground. They ceded the region to the United States in 1859, when a trading post was established. The city was incorporated in 1869, and reincorporated in 1873.

YANKTONS. See SIOUX.

YAPOCK, or Water Opossum, a rare marsupial animal of the genus *chironectes* (Ill.), of which the only described species is *C. variegatus*, found in Guiana and Brazil. The hind feet are powerful swimming organs; the fore feet are long, with an elongation of the pisiform bone

Yapock (Chironectes variegatus).

resembling a rudimentary sixth toe; the females have a perfect pouch; the habits are aquatic. It has large cheek pouches, and some of the lower molars have their tubercles arranged in a longitudinal series. The length is about 2 ft., of which the tail is 13 in., in proportions like the common brown rat; the fur is soft and thick, gray above, with large sooty-black patches, especially on the back, and white below. In habits it resembles the otters, with which it was long classed; it is an excellent diver and swimmer, and feeds upon small fish, crustaceans, and other aquatic animals.

YAQUIS, or **Hiaquis**, an Indian tribe in Sonora, Mexico, occupying Cocorin, Bacum, Torin, and five other towns on the Yaqui river. They are allied to the Pimas, and their language is a dialect of the Cahita. They are mild and tractable, but independent and brave in war. They are industrious, and make good farm laborers, miners, and boatmen. They weave cotton and agave, and make good pottery. They have a large stock of horses, sheep, and cattle. Catholic missions were begun among them in 1590. As a nation they are ruled by their own laws, and make their towns asylums, never surrendering a fugitive. They revolted against Spanish and Mexican rule in 1735, 1825, 1832, and 1841. In 1825 and 1832 they were led by Banderas, an able and eloquent commander, who was finally defeated by Gen. Urea. They speak in a loud rough tone, and their name is said to mean "He who shouts."

YARKAND, a city of East Turkistan, on the left bank of the river Yarkand, about 105 m. (according to the latest maps) S. E. of Kashgar; lat. 38° 20′ N., lon. 77° 30′ E.; pop. estimated by some at more than 100,000, but by late authorities at 30,000. It is surrounded by an earthen wall, and has two stone citadels, one on the S. side and one within the walls. The streets are intersected by canals. There are many caravansaries and mosques, two large bazaars, and several Mohammedan colleges. Silk, cotton, linen, and woollen cloths are manufactured, and an active trade is carried on with the surrounding cities. The trade in horses is important, and horse flesh is sold in the markets. Yarkand was formerly the capital of the Mohammedan kingdom of Kashgar, and was conquered by the Chinese in 1757. In 1863 a revolt broke out, which resulted in the expulsion of the Chinese and the formation of a Mohammedan government, with the capital at Kashgar.—The river Yarkand rises in the Karakorum mountains, flows N. W. and N. E., and joins the Kashgar more than 300 m. below the city. The united streams form the Tarim, which drains the great plain of East Turkistan and empties into Lake Lob.

YARMOUTH. **I.** A S. W. county of Nova Scotia, Canada, bordering on the Atlantic ocean, and intersected by Tusket river; area, 736 sq. m.; pop. in 1871, 18,550, of whom 11,707 were of English, 4,852 of French, 1,004 of Irish, and 603 of Scotch origin or descent. The coast is deeply indented, and the surface is extremely diversified with mountains, rivers, and lakes. The inhabitants are chiefly engaged in fishing. **II.** A port of entry and the capital of the county, on a bay on the S. W. coast of the province, 140 m. S. W. of Halifax; pop. in 1871, 5,335. It is in the midst of a fertile and well cultivated country. Ship building and fishing are largely engaged in. The value of imports for the year ending June 30, 1874, was $645,779; of exports, $272,277. Yarmouth contains many fine buildings, several hotels and banks, and manufactories of iron castings, machinery, and wooden ware. Two weekly newspapers are published. The Western Counties railroad, now building (1876), is to connect the town with Annapolis.

YARMOUTH, a municipal borough and seaport in the county of Norfolk, England, at the mouth of the Yare, 19 m. E. of Norwich; pop. in 1871, 41,792. It lies on both sides of the river, which is crossed by a drawbridge. The main part of the borough, known as Great Yarmouth, occupies a narrow peninsula about 1 m. long and ½ m. wide, between the sea on the east and the Yare on the west, on which side is a fine quay about 1 m. long. Great Yarmouth contains the guildhall, the town hall, the church of St. Nicholas, founded in the reign of William Rufus, a monument to Nelson 144 ft. high, and a theatre. It has about 40 churches, of which about one fourth belong to the church of England. Little Yarmouth, on the W. shore of the Yare, consisting mainly of private residences, and the village of Gorlestone on the south toward the entrance to the harbor, were annexed to the borough by the reform act of 1832. The harbor, built and maintained at great expense and defended by coast batteries, is accessible to vessels of 200 tons. In 1873, 1,342 British vessels of 147,720 tons, and 134 foreign vessels of 20,180 tons, entered the port. The exports were valued at £109,320. Yarmouth is the principal seat of the herring fishery of England. Ship building is carried on, and crapes and other silk goods are manufactured.—The site of Yarmouth was formerly the bed of an estuary, and became solid ground in the beginning of the 11th century. The mouth of the river has since 1350 been diverted about 4 m. to the south. In the reign of Edward I. a wall 6,720 ft. long, with 10 gates and 16 towers, was built around three sides of the town.

YAROSLAV (Russ. *Yaroslavl*). **I.** A central government of European Russia (formerly a grand duchy), bordering on Novgorod, Vologda, Kostroma, Vladimir, and Tver; area, 13,750 sq. m.; pop. in 1870, 1,000,748. It is watered by the Volga and several smaller rivers, including the Mologa. The country is flat, and occasionally marshy; the production of grain is inadequate for the consumption, but cattle and vegetables are more abundant. Fish are largely exported. The chief commercial place is Rybinsk. **II.** A city, capital of the government, at the junction of the Kotorosl and the Volga, 150 m. N. E. of Moscow; pop. in 1867, 37,275. It is an episcopal see, and has more than 60 churches, several convents, a theological seminary, a richly endowed lyceum and other schools, manufactories of woollen, linen, silk, bells, &c., and much trade.

YAROSLAV, grand duke of Russia. See Russia, vol. xiv., p. 489.

YARRELL, William, a British naturalist, born in St. James's, Westminster, in June, 1784, died in Yarmouth in September, 1856. He was a newspaper agent, and became a naturalist from being a sportsman. In 1824 he was chosen a member of the Linnæan society, and henceforth constantly contributed to its "Transactions" and to other periodical publications on natural history. He was one of the first members of the zoölogical society, and contributed 17 papers to the first volume of its transactions. Although self-taught, his anatomical descriptions are remarkable for their accuracy. He was the first to prove that the whitebait is a distinct species of fish, and not the young of the shad or herring. Besides about 70 monographs, he wrote "The History of British Fishes" (2 vols. 8vo, 1835–'6; supplement, 1839; 3d ed., with a memoir, 1859), and "The History of British Birds" (3 vols., 1839–'43; 3d ed., 1856). These works contain interesting descriptions and wood engravings of all the species of British birds and fishes.

YARROW (A. S. *gearwe*), the common name for *Achillea millefolium*, a plant of the composite family, sometimes called milfoil, introduced from Europe, where, as well as in nearly all parts of this country, it is a common weed, especially around settlements. The genus *Achillea* belongs to the same subfamily with chamomile, wormwood, tansy, and other strong-smelling composites, and contains a large number of species; the one known as yarrow is a perennial, with a creeping rootstock; the plant appears in spring as a flat dense cluster, 6 to 12 in. across, of finely and beautifully dissected leaves; later in the season there rise from the centre of this simple leafy stems, bearing at the top a dense terminal flat-topped corymb of small white flowers; the few rays are toothed at the apex, and are fertile, as are the whitish disk flowers. Occasionally the flowers are tinged pinkish, and sometimes a deep rose color, a form often found in gardens as *A. rosea.* The flowers and leaves have a bitter and astringent taste, and an aromatic odor, due to a volatile oil, which when separated by distillation is of a fine blue color. Yarrow was formerly much used as a vulnerary and to suppress internal hæmorrhages, and is still occasionally employed as a tonic and astringent. In some parts of Sweden it is put into beer as a substitute for hops. Though generally regarded as a weed, it appears to possess considerable nutritive properties, and it has been recommended in England as an addition to pastures. The double form of *A. ptarmica*, or sneezewort, with white flowers, is cultivated, as are also the yellow-flowered *A. tomentosa* and some others.

Yarrow (Achillea millefolium).

YARROW, a river of Selkirkshire, Scotland, which rises at Yarrow Cleugh, 1¼ m. E. of Loch Skene, and pursues a general E. N. E. course of 25 m., flowing through Lochs Lowes and St. Mary, and uniting with the Ettrick, a tributary of the Tweed, 1½ m. above Selkirk. Its current is fierce and precipitous. On its banks are the ruins of Newark castle, and Bowhill, the seat of the duke of Buccleuch. It receives about 40 small tributaries.

YASSY. See Jassy.

YATES, a W. county of New York, bounded E. by Seneca lake, and W. partly by Canandaigua and Crooked (now Keuka) lakes, the latter extending half way across the middle of the county; area, about 500 sq. m.; pop. in 1870, 19,595; in 1875, 19,686. The surface is generally undulating or hilly, and the soil is a fertile sandy loam. Iron ore is found. The county is intersected by the Northern Central railroad, and by the Crooked Lake canal. The chief productions in 1870 were 414,869 bushels of wheat, 28,375 of rye, 337,983 of Indian corn, 507,165 of oats, 354,067 of barley, 30,608 of buckwheat, 169,692 of potatoes, 670,272 lbs. of butter, 41,614 of cheese, 402,176 of wool, and 39,575 tons of hay. There were 6,692 horses, 6,511 milch cows, 6,491 other cattle, 74,439 sheep, and 5,656 swine; 5 manufactories of agricultural implements, 3 of bricks, 23 of carriages and wagons, 11 of saddlery and harness, 5 flour mills, 2 distilleries, 3 planing mills, and 7 saw mills. Capital, Penn Yan.

YATES, Edmund Hodgson, an English novelist, born in July, 1831. He is the son of an actor, and was for several years employed in the London post office as chief of the missing-letter department, retiring in 1872. He has been editor of "Our Miscellany," "Temple Bar," and "Tinsley's" magazines, and now (1876) edits the "World" newspaper. In 1872–'3 he lectured in the United States. He has published "My Haunts and their Frequenters" (1854); "After Office Hours" (1861); "Broken to Harness" (1864); "Pages in Waiting," "Running the Gauntlet," and "The Business of Pleasure" (1865); "Land at Last" and "Kissing the Rod" (1866); "The Forlorn Hope" and "Black Sheep" (1867);

"The Rock Ahead" (1868); "Wrecked in Port" (1869); "Dr. Wainwright's Patient" (1870); "Nobody's Fortune" (1871); and "The Impending Sword" (1874). With F. E. Smedley he wrote "Mirth and Metre, by Two Merry Men" (1854). He has also written some dramas, and was for six years theatrical critic of the "Daily News."

YATES, William, an English missionary, born at Loughborough, Leicestershire, Dec. 15, 1792, died at sea, July 3, 1845. He studied at Bristol college, and sailed for Calcutta, April 16, 1815, as a Baptist missionary. He settled at Serampore, where after the death of Dr. Carey he devoted himself entirely to translating and to preparing text books. He visited England and America in 1827–'9; and in 1845 he embarked for England on account of his health, but died on the passage up the Red sea. He translated the whole Bible into Bengalee; the New Testament and most of the Old into Sanskrit; and the New Testament into Hindee and Hindostanee. Among his most important works are: "Grammar of the Sanskrit Language" (Calcutta, 1820); "Sanskrit Vocabulary" (1820); "Essay on Sanskrit Alliteration;" "Introduction to the Hindostani Language" (in 3 parts, 1827); "Hindostani and English Dictionary" (1836); and "Biblical Apparatus" (in 4 parts, 1837). After his death was published from his manuscript an "Introduction to the Bengali Language," edited by J. Wenger (2 vols., 1847; reprinted under the title "Bengali Grammar," 1864).

YAUPON, an aboriginal name for *ilex cassine*, a North American shrub which derives its specific name from *cassena*, by which it was also known to the Indians. The characters of the genus *ilex* are given under Holly, this species, like that, belonging to the section with evergreen leaves. It is a slender shrub growing 8 to 12, and sometimes 15 ft. high, with short, spreading branches, which often terminate in a sharp point or spine, on which account it has been proposed as a hedge plant. The leaves, seldom over an inch long, are oval or oblong, obtuse, thick and shining, but without the large spiny teeth of those of the holly, the margins being merely scalloped by small rounded serratures; the flowers and abundant scarlet fruit much as in the holly. This species is found in light sandy soils from Virginia to Florida, and never at any great distance from the coast; it has proved to be hardy as far north as Philadelphia, and is worthy of cultivation as an ornamental shrub wherever it will endure the winters. The Indians held it in high esteem, and the early travellers in the Carolinas mention its leaves as an article of considerable traffic between the coast tribes and those living further inland. An infusion of the slightly roasted leaves produces effects similar to those of the Paraguay tea (see Maté), which is another species of *ilex*, being at first exhilarating if taken in moderate quantities, but in excess acting powerfully as an emetic, diuretic, and purgative. The Indians, especially those of the Creek nation, made use of the infusion, under the name of "black drink," in their most solemn ceremonies. A very strong infusion being made for state occasions, this was drunk by the men only; its first effects were those of a stimulant, but as the quantity taken was increased, one after another yielded to its emetic powers, and the ability to resist these the longest was regarded as an indication of superiority. Excessive vomiting was considered necessary to a proper purification for their ceremonials, and the drinking was continued until the tea was rejected unchanged in appearance. On account of its emetic properties the shrub has been called *I. vomitoria*, which name, however descriptive, cannot supersede the older *I. cassine*. In North Carolina, according to Barton ("Collections"), the people make use of it to purify and improve brackish water, a few leaves being boiled in it for a short time. Where the plant grows naturally its leaves are used as a domestic medicine, to act as a diuretic, emetic, or purgative, according to the quantity administered. They are also used in moderate quantities as a substitute for ordinary tea.

Yaupon (Ilex cassine)

YAVAPAI, the N. E. county of Arizona, bounded N. by Utah and E. by New Mexico; area, over 50,000 sq. m.; pop. in 1870, 2,142. The Colorado river crosses the N. W. corner, passing through deep and precipitous cañons. The N. E. corner is watered by a tributary of the Rio San Juan, the S. part by several affluents of the Gila, and the S. W. corner by the Rio Santa Maria, a branch of Bill Williams fork. The Colorado Chiquito, for a considerable portion of its course walled in by precipitous cañons, flows N. W. through the county near the centre, and empties into the Colorado. The greater portion of the surface has an elevation of 5,000 or 6,000 ft. above the sea, and some parts rise much higher. There are numerous mountain ranges, generally running N. and S. The N. part is mostly unexplored. The central and E. portions contain valuable farming, pastoral, and mining lands. The settlements are in the southwest, in the mining regions of Prescott and Wickenburg. The soil here is fertile, and pine forests abound. Gold and silver are found. In the northeast are the Moqui Indians. Capital, Prescott.

YAZOO, a river of Mississippi, formed by the junction of the Tallahatchie and Yalobusha rivers at Greenwood in Leflore co. From the junction it pursues a serpentine course, generally bearing S. W., till it enters the Mississippi above Vicksburg. Its length is 240 m. It is very narrow, deep, and sluggish, flowing through a rich alluvial country, and is navigable throughout. The Tallahatchie is navigable by steamers in high stages of water to Panola, and the Yalobusha to Grenada.

YAZOO, a W. county of Mississippi, bounded S. E. by Big Black river, and intersected by the Yazoo; area, 650 sq. m.; pop. in 1870, 17,279, of whom 12,395 were colored. The surface is level, and the soil a rich alluvium. The Mississippi Central railroad passes along the E. extremity. The chief productions in 1870 were 290,448 bushels of Indian corn, 5,171 of Irish and 35,509 of sweet potatoes, and 26,047 bales of cotton. There were 1,938 horses, 2,775 mules and asses, 3,040 milch cows, 7,563 other cattle, 1,838 sheep, and 11,251 swine. Capital, Yazoo City.

YEAMES, William Frederick, an English painter, born in Taganrog, Russia, where his father was British consul, in 1835. He studied in London, and spent several years in Florence, returning to England in 1858. In 1866 he became an associate of the royal academy. His works, consisting of historical and genre pictures and landscapes, include "The Toilet," "The Rescue," "Lady Jane Grey resisting Feckenham's Efforts to convert her," "The Fugitive Jacobite," "Sir Thomas More taken to the Tower," "The Infirm Child near the Fireside," "The Young Knight Arming," "Monks Scourging Themselves," and "Reception of the French Ambassadors by Queen Elizabeth after the St. Bartholomew Massacre."

YEAR, a period of time well known within and near the temperate zones of the earth as that in which the four seasons run through their course, and indicated upon all parts of the earth's surface by the apparent return of the sun at midday to the same position in the heavens, as from its place at our summer or winter solstice forth and back to the same place again, the length of which period corresponds nearly to the time of 365¼ diurnal revolutions of the earth (*i. e.*, days). For the astronomical principles that determine or explain many of the points in relation to the year, see Astronomy, Sun, Moon, Precession of the Equinoxes, and Nutation.—The year, as just defined, or that in which the sun, from having its place over either tropic, moves to the other and returns, or (what is the same thing) starting from the equator at the vernal equinox of our hemisphere performs its complete circuit to the vernal equinox again, is termed the tropical year; but it will be convenient, and is more instructive, to define the year in general terms as the period in which the earth completes the circuit of her orbit around the sun. Like all such intervals, the year varies in length according to the way in which it is measured. If we consider the earth's path without reference either to its shape or to the earth's own figure, we must refer her motions to the sun as centre and to the surrounding star sphere. Supposing a line drawn always to the earth's centre from the sun and prolonged to the star sphere, this line would travel round like the hand of a mighty dial; and the time in which it would complete one circuit is called the sidereal year. This period may therefore be defined as the interval between the successive returns of the earth to the same heliocentric position among the fixed stars, or the period in which the earth viewed from the sun's centre would appear to complete the circuit of the ecliptic. The sidereal year is not absolutely constant, because the earth is exposed to the perturbing influence of the other planets. Its mean value is 365d. 6h. 9m. 9·6s. Whether, apart from perturbations, the sidereal year is undergoing a secular change of length, is a question as yet undecided; certainly any such change must be exceedingly minute.—But instead of referring the earth's motion to the star sphere, we may consider it with reference to the shape of the earth's orbit. This orbit has two axes, for example, and either extremity of either axis might be considered as a starting point from which the year might be measured; so that we might measure a year as the interval between successive passages of the perihelion, or of the aphelion, or of mean distance following perihelion, or of mean distance following aphelion. Any one of these periods might be called the anomalistic year, because its beginning would be counted from the time when the anomaly either vanished or had its maximum value. In practice, however, the term is limited to the year measured from the perihelion. Thus the anomalistic year is the interval separating successive passages by the earth of the perihelion of her orbit. As the perihelion advances, the earth, after completing a circuit from perihelion to the same heliocentric longitude, has still to pass over the arc by which perihelion has advanced in the interval. Accordingly the anomalistic year exceeds the sidereal year; its mean length at present is 365d. 6h. 13m. 48·6s. It may perhaps appear strange to have the mean length at present spoken of, instead of the absolute mean; but the motion of the perihelion is so irregular, and passes through so many varying conditions in the course of long intervals of time, that we must be content to consider its present general rate of advance. It may be added that the interval between successive passages of the perihelion is not, as might be supposed, equal in length to the interval between successive passages of the aphelion. This is easily shown. The perihelion is at present advancing at the rate of 11·24″ per annum; so that, neglecting the minute gain while the earth is traversing this arc, the actual anomalistic year, estimated from the perihelion, exceeds the sidereal year by the time occupied by the earth in traversing an arc of 11·24″ with her perihelion motion of 1° 1′ 9·9″ per diem. Now if the anomalistic year were estimated from aphelion, the same would be true, only the earth's daily aphelion motion of only 57′ 11·5″ must be substituted. Since, with the more rapid motion, the arc 11·24″ would be traversed in less time, the anomalistic year estimated from the perihelion is slightly shorter than the anomalistic year estimated from aphelion. The length of the mean anomalistic year, however, is at present that above indicated, and therefore it follows that at present the actual interval between the earth's successive passages of perihelion is slightly shorter than the mean anomalistic year.—Thirdly, the year may be measured with reference to the earth's figure and position. For example, the plane of the earth's equator cuts the plane of the ecliptic in a straight line, which is carried round with the earth, moving almost exactly parallel to itself. Twice in each circuit, therefore, this line passes through the sun's centre, and the year may be measured from one or other of these epochs. One corresponds to the vernal equinox, the other to the autumnal equinox. Astronomers have selected the former to measure from, and the year thus measured is called the tropical year, or year of seasons, and is defined as the interval between the earth's successive passages of her vernal equinox. Since this point (when the earth viewed from the sun is at ♎ and the sun viewed from the earth is at ♈) retrogrades, the tropical year is less than the sidereal year. Its mean length is 365d. 5h. 48m. 48·6s. As in the case of the anomalistic year, the actual length of the tropical year depends on the point from which it is measured; for the earth's diurnal motion at the passage of her vernal equinox is not precisely equal to her motion at the passage of her autumnal equinox. Thus the length of the tropical year is not absolutely constant. Its length at present exceeds by nearly 13 sec. the length which it had in the time of Hipparchus. In like manner the length of the anomalistic year is slowly variable. The lengths of the four seasons, astronomically measured, are very nearly as follows: from the vernal equinox to the summer solstice, 92d. 22¾h.; from the latter to the autumnal equinox, 93d. 13½h.; from this to the winter solstice, 89d. 16¾h.; from this to the vernal equinox, 89d. 1½h.—For an account of the years and calendars of different nations, see CALENDAR, and CHRONOLOGY.

YEAST, the froth which rises upon the surface of beer and other liquors during fermentation, consisting principally of microscopic globules of a fungoid plant. This plant is also found in that variety of yeast which is developed in sedimentary fermentation. (See BREWING.) The history of this plant begins with its discovery in beer by Leeuwenhoek in 1680 by microscopical examination. Fabroni in 1787 regarded yeast as a vegeto-animal substance residing in peculiar utricles in grapes as well as in corn, but does not seem to have attached great importance to the existence of the yeast globules discovered by Leeuwenhoek. Thénard in 1803 recognized a relation between yeast cells and fermentation, but most of the chemists of that day who investigated the subject of fermentation seem to have regarded the functions of yeast as having more of a chemical than a physiological nature. In 1825 Desmazières found organisms in yeast which he regarded as animals. It was not till about 1837 that Cagniard de la Tour took up the microscopical observations of Leeuwenhoek, and, as has been said, "rediscovered the yeast plant." He declared that by its influence the equilibrium of the molecules of sugar was broken up, and measured the diameter of the cells, which he placed at $\frac{1}{2500}$ of an inch, and also observed that they developed by budding. Schwann of Jena made independently, about the same time, similar discoveries. Their observations were confirmed by Quevenne, Mitscherlich, and Turpin; the last placed the organism in the genus *torula* of Persoon, and this classification has been recognized until very recently. Yeast has also received the name of *mycoderma vini*. The torula has a mycelium, and it is held that ferments never have. Meyen, considering yeast to be a fungus, created a new genus for it under the name of *saccharomyces*. Kützing and others placed it among algæ, and in a separate genus called *cryptococcus*. Whether yeast is the cause or the effect, or simply an accompaniment of fermentation, has long been disputed, and it has not been positively decided that its presence is necessary for the commencement of the process of vinous fermentation; but the great weight of opinion leans toward the affirmative. (See FERMENTATION.) The most prominent advocate of this theory is Pasteur, who has made numerous elaborate experiments, not only to elucidate the nature of yeast, but to oppose the theory of spontaneous generation. Reess and others have divided the yeast genus of fungi into several species. Of these, *saccharomyces cerevisiæ*, or the yeast of beer, is again divided into two varieties, sedimentary or bottom and surface yeast; but the drawings of them have much resemblance, and in fact it is known that the one variety is readily convertible into the other by cultivation. The sedimentary yeast is developed at a considerably lower temperature than surface yeast, and with much less evo-

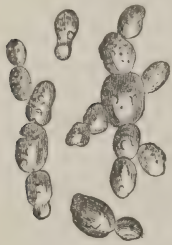


FIG. 1.—Saccharomyces cerevisiæ—Yeast of sedimentary beer, budding, magnified 400 diameters.

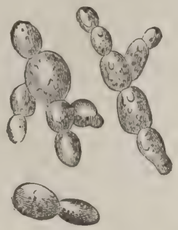


FIG. 2.—Saccharomyces cerevisiæ—Yeast of surface beer, budding, magnified 400 diameters.

lution of carbonic acid gas. This want of buoyant gas is the cause of its settling to the bottom, and there, in consequence of less exposure to the air, it becomes less active; but its activity can be readily restored by raising the temperature of the fermenting mass, in which case, after a few fermentations, the sedimentary is converted into surface yeast. The cells of *saccharomyces cerevisiæ* are round or oval and from ·00031 to ·00035 of an inch in diameter. (See figs. 1 and 2.) The cell wall is an elastic membrane of colorless cellulose, with colorless protoplasm, which often contains small granules, and one or two vacuoles containing cellular juice. When the cells are not undergoing development they are usually separate; but when the yeast is forming, its method of growth causes the cells to be joined to one another in pairs, groups, or chains, the latter being more particularly the case in the rapid development of surface yeast. During fermentation, or the development of yeast, there is an elevation of temperature, probably due to the combustion of oxygen, which may be obtained from the air or from the decomposition of sugar in the fermentable liquid. In fact the respiration or consumption of oxygen by the yeast cells bears some comparison to the respiration of animal pulmonary tissue. The multiplication of the cells of *saccharomyces* when in contact with an appropriate fermentable liquid is by budding, but under other circumstances, as has been shown by Reess and others, it may multiply by means of spores. (See Schützenberger "On Fermentation," New York, 1876, pp. 49, 50.)

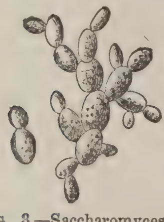


FIG. 3.—Saccharomyces ellipsoideus, in process of budding, magnified 600 diameters.

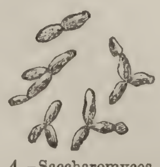


FIG. 4.—Saccharomyces exiguus, magnified 350 diameters.

S. ellipsoideus is Pasteur's ordinary alcoholic ferment of wine. The adult cells have an ellipsoidal form, being about ·00024 in. in length by ·000176 in. in breadth. (See fig. 3.) The multiplication by budding and by spores does not differ from that of *S. cerevisiæ*. *S. exiguus*, fig. 4, according to Reess, has cells of only ·000098 in. in breadth by ·000118 in. in length, and multiplies like the other varieties. *S. conglomeratus*, fig. 5, is rare, and is found mostly in the must of wine toward the end of fermentation. It has spheroidal cells ·000236 in. in diameter, conglomerated together; the cells, springing from buds, do not become detached from the parent cell until they have attained the same size. *S. apiculatus*, fig. 6, is the most abundant alcoholic ferment, and is found on the surface of all kinds of fruit, especially on berries and stone fruits. It has been found in certain kinds of beer, as that of Belgium, which undergoes spontaneous fermentation, yeast not being added to the wort.

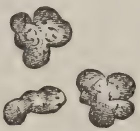


FIG. 5.—Saccharomyces conglomeratus, magnified 600 diameters.

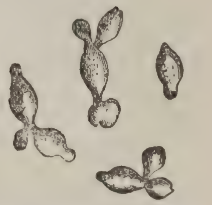


FIG. 6.—Saccharomyces apiculatus, magnified 600 diameters.

According to Engel, this species does not belong to the genus *saccharomyces*, and he calls it *carpozyma apiculata*. The greater diameter of the cells is about ·000236 in. *S. Pastorianus*, fig. 7, is a species which appears in the after fermentation of wines, especially of sweet wines, and those of other fruits than the grape.

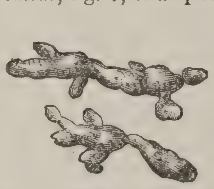


FIG. 7.—Saccharomyces Pastorianus, alcoholic ferment of wine, magnified 400 diameters.

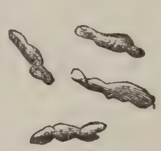


FIG. 8.—Saccharomyces Reesii, ferment of red wine, magnified 350 diameters.

The cells are oval, pyriform, or club-shaped, and vary in dimensions from ·000236 to ·00078 of an inch. *S. Reesii*, fig. 8, accompanies *S. ellipsoideus* in the must of red wines. It has elongated cylindrical cells. *S. mycoderma* (*mycoderma vini*) is shown in fig. 9. The *mucor mucedo* and *M. racemosus*, fig. 10, have the property, when placed in a solution of sugar and protected from access of oxygen, of transforming or dividing their mycelium into joints having the form of balls, which latter multiply by budding. "This fact," Schützenberger remarks, "which is indisputably proved, gives considerable support to the theories brought forward by some men of science as to the transformation of ferments, from one to another, according to the conditions under which they are placed." The classification of Reess as given above is not accepted on all hands, for the chief reason just given, that it has been observed that yeast fungi appear to have the property of changing into a variety of forms. Thus Dr. W. B. Carpenter ("The Microscope and its Revelations," London, 1874) says: "It would appear that yeast may be produced by sowing in a liquid favorable to its development the sporules of any of the ordinary moulds, such as *penicillium glaucum*, *mucor*, or *aspergillus*, provided the temperature be kept up to blood heat; and this even though the solution has been previously heated to 284° F., a temperature which must kill any germs it may itself contain." Prof. J. Cienkowski has made a series of experiments on the development of *mycoderma vini*, in which he finds that the white pellicle which forms on the surface of various organic fluids, as urine, beer, milk, fruit juice, and cucumber juice, consists principally of two ingredients, *mycoderma vini* and *oïdium lactis*, the special ferment of milk. (See "Quarterly Journal of Microscopical Science," April, 1875.)—The chemical composition of yeast is remarkable from its large amount of nitrogen. Careful analyses by Schlossberger give the following for the two varieties of beer yeast:

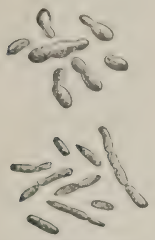


FIG. 9.—Saccharomyces mycoderma, magnified 250 diameters.

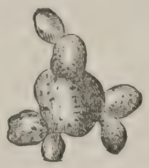


FIG. 10.—Mucor racemosus, ferment in mass.

CONSTITUENTS.	Surface yeast.	Bottom yeast.
Carbon	49·9	48·0
Hydrogen	6·6	6·5
Nitrogen	12·1	9·8
Oxygen	31·4	35·7
Ashes	2·5	3·5

An analysis by Mulder of the organic elements without the ashes gives a composition nearly allied to albumen: carbon, 53·3; hydrogen, 7·0; nitrogen, 16·0. There are probably, therefore, one or more albuminoid substances in the yeast cell, in which it resembles other vegetable cells. An analysis by Schlossberger, in which he treated the yeast with a weak solution of potash, did not give a result which so nearly agreed with albumen, but he obtained a residuum which when dissolved in acetic acid showed a composition allied to that of cellulose: carbon, 44·9; hydrogen, 6·7; nitrogen, 0·5; remaining ashes, 1·1. Mitscherlich says the ashes of beer yeast are thus composed:

CONSTITUENTS.	Surface yeast.	Bottom yeast.
Phosphoric acid	53·9	59·4
Potassa	38·8	28·3
Magnesia	6·0	8·1
Lime	1·0	4·3
Silica	traces	....

In this it is seen that the chief constituents are phosphoric acid and potash, and a calculation of the state in which all the elements are combined may be made as follows:

CONSTITUENTS.	Surface yeast.	Bottom yeast.
Phosphoric acid	41·8	39·5
Potassa	39·8	28·3
Magnesian phosphate	16·8	22·6
Calcium phosphate	2·3	9·7

These analyses have a strong resemblance, particularly in albuminoid elements, to those obtained with mushrooms and other fungi. The elaborate experiments of Boussingault show that ordinary plants have the power to eliminate nitrogen from its saline compounds, the nitrates, and the question has arisen whether yeast has the same power. The experiments of Dubrunfaut lead to the affirmative, while those of Ad. Mayer give a negative indication. The experiments of Pasteur, in which he supplied the growing yeast with a solution of pure sugar, to which were added ammonium tartrate and the ashes of yeast (containing phosphates), go to show that the ammonium salt slowly yields its nitrogen, which is transformed into albuminoid matter, while the phosphates contained in the ashes furnish mineral matter to the new plant. But according to the observations of M. Cloëz it is possible that ammoniacal salts are gradually transformed, before the nitrogen is appropriated, into nitrates; this idea agrees with the ordinary phenomena of nitrification, and it has been found that, although yeast may decompose ammoniacal compounds, its own more natural nitrogenous aliment is contained in the juices of plants. M. Pasteur maintains the absolute dependence of the development of yeast upon the presence of alkaline phosphates; but the statement was disputed by Liebig, who contended that other conditions of M. Pasteur's experiments prevented development.

YEAST POWDERS, or **Baking Powders**, substitutes for yeast, used in making bread. The chief object of the use of yeast in bread is to develop carbonic acid gas in the dough, by which bubbles are formed in it and give it lightness. By many this process is preferred, as any decomposition of the flour is avoided. Some of the carbonates of the alkalies are commonly used for the purpose. Bicarbonate or sesquicarbonate of soda may be used in connection with sour milk, or tartaric acid, or bitartrate of potash. Sometimes the acid and carbonate are mingled together in a perfectly dry state, and are therefore mixed with the flour at the same time previous to wetting. Phosphate of lime has been added to baking powders with the intention of restoring the phosphates which may have been lost with the bran in bolting the flour. Carbonic acid is also added to the dough of bread mechanically, under pressure, and such bread is called aërated bread. Beer yeast may also be used in the form of powder, or in cakes, by mixing it with flour or Indian meal, and drying it. It is usual to allow the paste to ferment after the yeast is added to the flour.

YEDO. See Tokio.

YEISK, a town of European Russia, in the Ciscaucasian territory of the Kuban, at the mouth of the Yeya, 125 m. N. N. W. of Yekaterinodar; pop. about 30,000. It was built in 1848, on a tongue of land which separates the Yeisk estuary from the sea of Azov, and has become an important centre of trade and industry. The principal exports are grain, wool, and linseed.

YEKATERINBURG, a city of Russia, on the Asiatic or E. side of the Ural mountains, on the Isset, in the government and 180 m. S. E. of the city of Perm; pop. in 1867, 24,500. It is the administrative capital and chief emporium of the Ural mining districts. It has two cathedrals, ten other churches, some palatial residences, gardens and parks, an observatory, a mineralogical museum, a chemical laboratory, a mining and other schools, a mint for copper coinage, and government iron works and machine shops. The rich mines in the vicinity include copper, and especially iron and platinum, which last is found almost exclusively in this region. The gold washings in the Isset are of some importance. Malachite and other precious stones, brought from Siberia, are worked at the great lapidary establishments. Jasper vases are ornamented with delicate carvings, executed with extraordinary skill and taste by workmen engaged at very low wages. The "granite" works, which belong to the government, turn out columns, pedestals, tables, and many other articles unrivalled in workmanship. Yekaterinburg was founded by Peter the Great in 1722, and was named after the empress Catharine I.

YEKATERINODAR, a town of European Russia, capital of the Ciscaucasian territory of the Kuban, on the left bank of the river Kuban, 140 m. S. by W. of Azov; pop. in 1867, 8,765. It is a wretched place, surrounded by morasses. Gardens are attached to the houses, which are mostly of earth, though a few are of wood. It has a cathedral with six modern towers, and a *krepost* or timber fortress, where the hetman of the Cossacks resides.

YEKATERINOGRAD, a fortified town of European Russia, in the Ciscaucasian territory of the Terek, on the left bank of the river Terek, 20 m. W. of Mozdok; pop. about 5,000. It is a chief military Cossack station, and is noted for its abundance of pheasants, which form the principal food. It was founded in 1777 by Potemkin, in whose honor Catharine II. erected here an arch of stone.

YEKATERINOSLAV. I. A government of South Russia or New Russia, bordering on the governments of Kharkov, Poltava, Kherson, and Taurida, the sea of Azov, and the Don Cossack territory; area, 26,146 sq. m.; pop. in 1870, 1,352,300, including Great Russians, Cossacks, Germans, Tartars, Persians, Greeks, Jews, Armenians, Georgians, Arnauts, Bulga-

Yekaterinburg.

rians, Serbs, and Roumans. The country is flat and steppe-like, excepting along the hilly shores of the Dnieper, the chief river. The soil is favorable to agriculture and the raising of cattle; some of the finest-wooled sheep of Russia are in this government. Timber is scarce, but coal abounds. Fruits, including figs and almonds, are produced in the south, as well as wine, much of which is made from the sloe or wild plum. Silk is also produced. Yekaterinoslav was peopled with new colonies in 1752, and called New Servia, and after 1764 New Russia; since 1783 it has formed the present government, containing many cities, the most important of which are the seaports Taganrog, Mariupol, and Alexandrovsk, the fortress Rostov, and Nakhitchevan, the headquarters of the Armenians. **II.** A city, capital of the government, on the right bank of the Dnieper, 250 m. N. E. of Odessa; pop. in 1867, 22,548. It has seven churches, a gymnasium with a public library, an ecclesiastical seminary, a botanic garden, a park, cloth and silk manufactories, and an annual wool fair. There is much trade with Odessa. In the vicinity is a ruined palace of Potemkin, who founded the town in 1784, and named it after the empress Catharine II.

YELISAVETGRAD. See ELISABETHGRAD.

YELL, a W. county of Arkansas, bounded N. E. by Arkansas river, and intersected by its tributaries Fourche la Fave and Petit Jean rivers; area, 936 sq. m.; pop. in 1870, 8,048, of whom 767 were colored. It has a diversified surface, and the soil is generally fertile. The chief productions in 1870 were 13,802 bushels of wheat, 206,075 of Indian corn, 11,890 of oats, 6,269 of Irish and 15,932 of sweet potatoes, 97,392 lbs. of butter, 2,999 of wool, 4,404 of tobacco, and 3,671 bales of cotton. There were 1,397 horses, 5,336 cattle, 2,200 sheep, and 14,224 swine. Capital, Danville.

YELLOW BIRD. I. The American goldfinch or thistle bird (*chrysomitris tristis*, Bonap.).

Yellow Bird (Chrysomitris tristis).

It is 5¼ in. long and 8¾ in. in extent of wings. The male is of a bright gamboge-yellow color, with black crown, wings, and tail; band across wings, inner margin of tail feathers, and upper and under tail coverts, white; in winter it is yellowish brown above and ashy brown below, very much like the females at all seasons. It is generally distributed over North America, seldom alighting on the ground except to drink and bathe; many are usually seen together, feeding on the seeds of hemp, sunflowers, lettuce, and thistles, and sometimes on elder and other berries; the song is very pleasing, and for this as well as its beauty, sprightliness, and docility, it is kept in cages; it lives for years in confinement, practising many of the tricks taught to canaries, with which it will breed. Like the European goldfinch, it makes its nest, in a tree or bush, of lichens fastened together with saliva, and lined with the softest substances it can procure; the eggs are four to six, white tinged with bluish, with reddish brown spots at the larger end; one brood only is raised in a season, and the young follow their parents a long time, being fed from their mouths. Several other nearly allied species are described in vol. ix. of the Pacific railroad reports. **II.** The summer yellow bird, or yellow-poll warbler (*dendroica æstiva*, Baird), is of about the same size, with the head and lower parts bright yellow; rest of upper parts yellowish olivaceous, the back, breast, and sides streaked with brownish red; tail bright yellow, with the outer webs and tips brown; two yellow bands on the wings; bill dark blue; in the female the crown is greenish olive. It is found throughout the United States, going north to lat. 68°, south to Central and South America and the West Indies, and extending from the Atlantic to the Pacific; numerous in New England in the summer, it goes south in autumn in small flocks, chiefly at night; its song is not melodious; the food consists principally of insects, which are sought for among the leaves and blossoms. It builds in bushes, often very near dwellings and in thickly settled places; the nest is strongly fastened to the fork of a bush, and is made externally of hemp, flax, wool, cotton, or the down of the brake, and is lined with hair and soft materials; the eggs are four or five, ⅝ by ½ in., light dull bluish white, with numerous dots and marks of dull reddish brown; only one brood is raised in New England, which are carefully fed and protected, the parents using the most ingenious devices to draw away intruders. The cow bird often selects the nest of the summer yellow bird in which to deposit one of its parasitic eggs; the yellow bird, as it cannot eject the large strange egg, picks a hole in it, and buries it at the bottom of the nest, placing a new floor over it; it sometimes buries its own eggs with that of the cow bird, and lays others; if by chance the cow bird visit the second nest, it buries the eggs a second time, giving rise to the three storied nests occasionally found by egg hunters.

YELLOW-EYED GRASS, the common name for plants of the genus *xyris* (Gr. ξυρίς, some plant with two-edged leaves), which consists of biennial or perennial rush-like plants, and gives its name to a small order of endogens, the *xyridaceæ.* The plants have sword-shaped leaves sheathing the base of an otherwise naked stem, which in the different species is from 2 in. to 4 ft. high, cylindrical or flattened, and bearing at its summit an ovoid or oblong spike, consisting of rounded, firm, sometimes crustaceous, imbricated bracts, from the axil of each of which a small yellow flower is produced. The calyx consists of three sepals, the two lateral boat-shaped, and often fringed on the keel; the petals three; stamens six, the three alternate ones sterile and often bearded at the summit; the one-celled, three-valved capsule containing numerous small seeds. More than 50 species are described, of which about 15 belong to the United States, especially southward; one species, *X. flexuosa*, and its variety *pusilla*, extend from Vermont to Lake Superior; they mostly grow in sandy swamps and pine barrens, where they produce their small, bright yellow flowers all summer. Though of no economical importance, the plants are of much interest to the botanist.

YELLOW FEVER. See Fevers, vol. vii., p. 165.

YELLOW-HAMMER (*emberiza citrinella*, Linn.), a very common European bird of the bunting family. It is 7⅛ in. long and 11 in. in extent of wings; in the male the head and throat are bright yellow, on the crown the feathers tipped with black; breast brownish red; back and wings bright red, the centre of each feather brownish black; body rather stout. It is very common throughout Europe in the wooded districts, familiar, and a permanent resident; in winter it is seen with sparrows, finches, &c., in the fields, and about hedges, coming into farm yards when the ground is covered with snow; the food consists of the seeds of grains and grasses; the nest is on or near the ground, and the eggs four or five, ⅚ by ⅔ in., purplish white with streaks and dots of black. When deprived of its eggs, its doleful notes in some parts of Scotland have been interpreted as "De'il, de'il, de'il take ye;" hence its name of "devil bird."

YELLOW-LEGS (*gambetta flavipes*, Bonap.), a North American wading bird of the tattler family. It is about 10½ in. long and 19¾ in. in extent of wings, considerably smaller than the tell-tale tattler (see Tattler), which it resembles in colors; the bill is 1½ in., straight and slender; wings long and pointed, tail short, legs long with lower half of tibia naked. The general color is ashy above, with many large arrow-heads and spots of brownish black edged with ashy white; rump and upper tail coverts white, the latter barred with ashy brown; lower parts white, with numerous lines on the neck and arrow-heads on the sides dark ashy brown; bill greenish black, and legs yellow. It is generally distributed over eastern North America, and is one of the most abundant of the group on the Atlantic slope from Maine to Florida, chiefly in the interior; it migrates to Mexico and Central America in winter. It is usually seen in small flocks wading in search of small fry, shrimps, worms, and aquatic insects, both in salt and fresh water; in dry weather the flocks are found on the uplands, feeding on grasshoppers and other insects; during flight the long yellow legs are stretched out behind. The nest is made among the grass on the edges of rivers and ponds. In autumn they get very fat and are good eating.

YELLOW MEDICINE, a S. W. county of Minnesota, bounded N. E. by the Minnesota river; area, 792 sq. m.; pop. in 1875, 2,484. It is watered by the Lac qui Parle and Yellow Medicine rivers. The surface is an uneven table land, consisting of open plains and prairies. Capital, Granite Falls.

YELLOW RIVER, or **Hoang-ho.** See China, vol. iv., p. 442.

YELLOW-ROOT, a common name applied in different parts of the country to different plants; the most important of these, *hydrastis*, is described elsewhere under one of its several common names. (See Puccoon.) Another plant of the same family is *xanthoriza apiifolia*, the common name being a translation of the generic (Gr. *ξανθός*, yellow, and *ῥίζα*, a root); it is sometimes called yellow-wood, a name which properly belongs to *cladrastis*, a large tree (see Virgilia), and also shrub yellow-root. The genus belongs to the crowfoot family (*ranunculaceæ*), and is remarkable as being the only member of the family within the United States that forms an erect shrub; there is but one species, found sparingly in New York, and more abundantly along the mountains from Pennsylvania southward. It has long, creeping, yellow roots and rootstocks, sending up sparingly branched woody stems, seldom over 2 ft. high; the pinnately compound leaves have 3 to 7 ovate-toothed leaflets; the polygamous flowers appear in early spring from terminal buds, in compound drooping racemes, and are brownish purple; the 5 to 15 pistils ripen into one-seeded pods. The bright yellow roots were used by the Indians as a dye; they contain berberine. It is intensely bitter, and is used as a tonic in the same manner as columbo, quassia, and similar bitter medicines.—The plant usually known as gold-thread (see Coptis) is in some localities called yellow-root, as are also *celastrus* (see Waxwork) and the twin-leaf, *Jeffersonia diphylla* (see Jeffersonia).

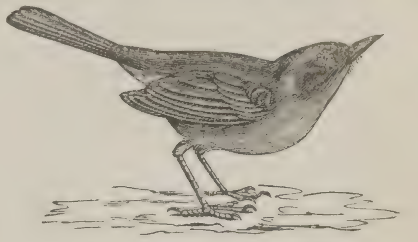
YELLOW SEA (Chinese, *Hoang-hai*), a large sea on the N. E. coast of China, between the peninsula of Corea on the east, the Chinese provinces of Kiangsu, Shantung, and Chihli on the west, and Shinking or Liaotung on the north. In the northwest it terminates in the gulfs of Liaotung and Pechili; the latter is important from its reception of numerous large rivers, among which are the Pei-ho and Hoang-ho. The two gulfs are nearly separated from the remainder of the Yellow sea by the Shantung promontory, and the long narrow peninsula known as the "Regent's Sword." On the E. coast are numerous groups of islets, forming the Corean archipelago. The sea is very shallow, and it derives its name from the turbidness of its waters, which flow over a bottom of yellow alluvium easily stirred up by vessels passing over it. Its length is about 600 m., and its greatest breadth about 400 m. The Hoang-ho or Yellow river carries into it an immense quantity of detritus.

YELLOW SPRINGS, a village of Miami township, Greene co., Ohio, 75 m. N. E. of Cincinnati; pop. in 1870, 1,435. It is on the Springfield branch of the Little Miami division of the Pittsburgh, Cincinnati, and St. Louis railroad. It takes its name from a mineral spring of local celebrity. The village has a graded school for white children, an ungraded school for colored children, and Baptist (colored), Christian, Episcopal, Methodist (one white and one colored), Presbyterian, and Roman Catholic churches. It is chiefly noted as the seat of Antioch college. (See ANTIOCH COLLEGE.) The village was incorporated in 1854.

YELLOWSTONE NATIONAL PARK. See WYOMING, territory.

YELLOWSTONE RIVER, a tributary of the Missouri, rising in Yellowstone lake, in the Yellowstone national park, N. W. Wyoming, near the sources of the Madison (the main constituent of the Missouri) and the Snake. It flows first N. through a series of cañons, about 100 m., into and through a portion of Montana, when, issuing from the mountains, it pursues an E. N. E. course of about 500 m. to its mouth on the border of Montana and Dakota. The lake is 22 by 15 m. in extent, with an elevation of 7,788 ft. above the sea and a maximum depth of 300 ft. Its shores are rugged but picturesque. It contains immense numbers of salmon trout. The Upper Yellowstone, about 25 m. long, the ultimate source of the river, flows into it. The elevation of the mouth of the Yellowstone is 2,010 ft. About 15 m. below the lake are the upper falls, where the river, after passing through a series of rapids, makes an abrupt descent of 140 ft. The lower falls, ½ m. further down, are 360 ft. high. The stream then flows for 20 m. through the Grand cañon, whose perpendicular sides, from 200 to 500 yards apart, rise to the height of 1,000 ft. Just below the Grand cañon the river receives Tower creek, which flows through a gloomy cañon, 10 m. long, known as the "Devil's Den." About 200 yards above its mouth the creek has an abrupt fall of 156 ft., surrounded by columns of breccia resembling towers. Below the mountains the course of the Yellowstone lies through a wide open valley bounded by high rolling hills. Lignite is abundant along its banks. Its chief tributaries, proceeding down the stream, are Shields river and Great and Little Porcupine rivers on the left, and Beaver river, Big Rosebud creek, Clarke's fork, Pryor's, Big Horn, Rosebud, Tongue, and Powder rivers on the right. The Big Horn and Powder are much the largest of these tributaries. The Yellowstone is navigable to near the mouth of the Big Horn, about 300 m. above the Missouri.

YELLOW-THROAT (*geothlypis trichas*, Caban.), a very common North American warbler. It is 5½ in. long and 7¼ in. in extent of wings; the color is olive-green above, tinged with brown on the crown; chin, throat, breast, and under tail coverts, bright yellow; abdomen dull whitish buff; broad black band on forehead, bordered behind by hoary white; in winter in the males, and always in the females, there is no black band on the forehead; the wings are short and rounded, with the fourth quill the longest, the tail considerably graduated, and the legs long and yellow. It is found throughout North America, but is most abundant in the middle states, especially in Maryland, preferring the neighborhood of swamps. The song, though not very musical, is pleasing, and from its frequent repetition forces itself on one's notice, as it hops from twig to twig in search of insects, caterpillars, and spiders, uttering its "whittititee." The nest is made on the ground, even partly sunk in it, and is occasionally covered, whence the common name of "oven bird;" it is constructed externally of leaves and grass, and lined with hair; the eggs are four to six, ⅝ by ½ in., white with light brown specks, and are laid about the middle of May. Its nest is often selected by the cow bird as the place of deposit for one of its parasitic eggs, which is generally hatched out at the expense of the yellow-throat's own offspring, this warbler not possessing the remarkable instinct of another noticed under YELLOW BIRD. In some districts it raises two broods in a season.



Yellow-throat (Geothlypis trichas).

YEMASSEES, Yamassees, or **Savannahs,** a tribe of American Indians figuring in South Carolina history, and apparently comprising some or all of the bands of southern or Spanish Shawnees. They were in Florida about 1680, and soon after commenced hostilities against the Spaniards. They then retired to the Savannah and settled on the N. E. side, where, becoming allies of the English, who called them first Savannahs and then Yemassees, they formed a check to the Spaniards. In 1705 they were won over by the latter, or from their restless character formed a confederacy of tribes, and began a general massacre, April 15. They advanced to Stono, killing all and burning the settlements. Gov. Craven met them at Saltcatchers, defeated them, and drove them beyond the Savannah, when they retired to Florida. Three years later they made a raid into South Carolina, and were again defeated. After this they are scarcely mentioned in English accounts, but the Spanish notices indicate that they retired to the Creeks. They are thus identified with the Shawnee band which afterward moved north to the Ohio, and from which Tecumseh sprung.

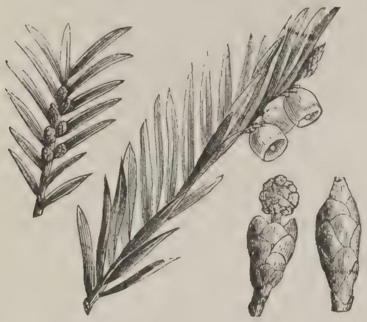
YEMEN, a province of the Turkish empire, in Arabia, bounded N. by Hedjaz and the desert, E. by the desert and Hadramaut, S. by the gulf of Aden, and W. by the Red sea; pop., according to Turkish authorities, about 2,250,000. The coast line, which is about 750 m. long, is bordered with coral reefs, within which is good anchorage. These sometimes form islands, of which the largest is Farsan. A range of mountains, the continuation of the Hedjaz chain, extends through Yemen from N. to S., 20 to 50 m. from the coast, dividing it into the Tehama, or lowland between the mountains and the sea, and the Jebel, a mountainous plateau E. of the chain. The Tehama is a flat sandy desert, with scarcely any vegetation except where watered by mountain torrents. Rain falls there only at intervals of several years, and the climate is intensely hot. The mountains, which rise abruptly from the lowlands, enclose valleys of great fertility and beauty, and their slopes are covered with luxuriant forests. The table land has an estimated general elevation of 4,000 ft., but some of the peaks are from 5,000 to 6,000 ft. high. Jebel Sabir, near Taiz, one of the highest, is an immense mass of volcanic rocks, covered with groves and verdure nearly to its summit; the Arabs assert that all the herbs of the earth grow on its slopes. Numerous villages are perched among its cliffs, and within its precints are said to be more than 100 independent sheikhs. Water is abundant in the highlands in the rainy season, which lasts from June to September, but in the hot season most of the streams are dry. Few of the rivers reach the sea; among them are the Laa, Heidan, and Kebir on the W. coast, and the Aden, Bonna, and Meran on the S. coast. Several large streams flow toward the interior, and are probably lost in the desert. The Kharid, supposed to be identical with a river mentioned by Strabo, which the Roman army crossed before entering the Sabæan territory, is more than 120 m. long, and flows N. E. from the mountains N. of Sana. The Shibwan or Dana, further S., pursues a similar course, and waters the plain in which is Mareb or Marib, the ancient Mariaba, the capital of the Himyaritic kingdom of Saba, the supposed Sheba of the Bible. Near it are the remains of the great dike, built, as is supposed, about 1750 B. C. This immense work was constructed at a place where two mountains approach each other, was two miles long and 120 ft. high, and was of cut stones secured by metal clasps and cemented with bitumen. The surrounding country, irrigated with the waters from this reservoir, was very fertile and sustained a vast population; and the catastrophe of the bursting of the dike, which is generally placed some time after the Christian era, marks an epoch in Arab history. The plain, from which the flood swept the ancient city, now contains but a few small villages inhabited by shepherd Bedouins. In the highlands the art of irrigation is still carried to a perfection unknown in other parts of Arabia. Artificial canals are built to convey the waters of the mountain torrents to the plains, and cisterns are constructed on all the cultivated slopes. When these are exhausted water is drawn from wells in the valleys and carried up the hills in skin bags on donkeys. Trees, grass, and cultivated fields exist wherever water can be procured. In the valleys the villages are embellished with gardens and palm groves, and most of the fertile slopes and even steep mountain sides are covered with coffee plantations, rising in terraces sometimes to a height of 3,000 ft. above the sea; higher up the cultivation of the tree is unprofitable. From these plantations comes the celebrated Mocha coffee. Khat (*celastrus edulis*), a small shrub the leaves of which resemble the willow, and when dried taste something like tea, is also cultivated extensively; the Arabs chew it as a stimulant. Wheat, barley, rice, and durra yield in abundance. Among the fruits are the date, fig, tamarind, grape, peach, apricot, and pomegranate. The banana, mangosteen, and other Indian fruits have been introduced and naturalized. Melons grow in great variety and abundance, and constitute in their season a large part of the food of the people. Many leguminous plants, carrots, radishes, lettuce, and other vegetables are cultivated, and aromatic herbs and flowers grow in profusion. The trees yielding gums and balsamic resins are more numerous here than in any other part of the globe. Wild animals are few; but the panther, hyæna, wolf, jackal, fox, wild boar, wild dog, and monkey are sometimes found in the mountains. Singing birds frequent the groves. There are many kinds of lizards, and the land tortoise is common. The principal domestic animals are the camel, ass, sheep, and goat. Horses are imported from Nedjed, and cattle from Nubia and India.—Yemen is divided into the livas or districts of Sana, Asir, Taiz, and Hodeida. Sana has succeeded Hodeida as the capital of Yemen. The chief coast towns are Hodeida, Jezan, Loheia, and Mocha. Aden, on the S. coast, and the island of Perim belong to Great Britain. The principal inland towns, besides Sana, are Zebid and Beit el-Fakih in the Tehama, Dhamar, Taiz, Mahail, El-Hauta in Lahej, Khamir, Khaiwan, Saadeh, and Abu Arish. There are many small walled towns, and several strong fortresses, the principal of which are El-Atarah in the Harraz mountains, and Kokaban, 18 m. W. of Sana. At Zebid is a school for the Sunnis, and at Dhamar is another for the Zeïdis, the prevailing sect. The inhabitants of the mountains are slight but well built, and of lighter color than the people of the Tehama. Their dialects are numerous and differ materially from those of the latter. The merchants in the towns are generally rich, and the peasantry of the rural districts are in comfortable circumstances. Banian merchants are numerous in the interior, and many of the artisans are Jews. —For the early history of Yemen, see ARABIA. It formed a province of the Arabian caliphate till 930, when the yoke of the Abbassides was thrown off and an independent imamate was founded, with Sana for its capital. In 1173 Turan Shah, brother of the celebrated Saladin, the Egyptian sultan, invaded the country, captured Sana and the ports, and erected strong fortifications at Aden. In 1503, after a period of anarchy, the imamate was again established at Sana, and it remained independent till 1538, when the Turkish sultan Solyman sent a fleet down the Red sea, conquered the entire coast, and made Sana the seat of an Ottoman pashalic. In 1630 the people drove out the Turks, and a new dynasty of imams was established with Sana as the capital. In 1728 a chief in the south threw off the yoke of the imam of Sana and established the sultanate of Lahej. The Turks obtained no further foothold in Yemen till 1832, when a mutinous officer of Mehemet Ali, encouraged by the Porte, marched from Jiddah, and captured Hodeida, Zebid, and Mocha; but in the following year the Egyptians took Mocha by assault, drove out the Turks, and held the Tehama till 1840, when they evacuated the country. In 1849 the Turks again seized upon all the chief towns of the Tehama, and in July of the same year the imam of Sana, who had lost the power to control his subordinate chiefs, signed a treaty at Hodeida, acknowledging himself a vassal of the Porte. A garrison of 1,000 men was sent to Sana, but the exasperated inhabitants massacred them. For more than 20 years the Turks were confined to the Tehama, where they ruined all the towns by their exactions and drove the greater part of the trade to Aden; but in March, 1872, an expedition invaded the interior from Hodeida. The Arabs made a gallant resistance, but the fortresses of El-Atarah and Kokaban were captured, and Sana was once more occupied by a Turkish garrison. The dynasty of the imams had previously come to an end, and independent chiefs were then ruling in their several districts. The Turks have since, with more or less success, overrun the interior, with the exception of Lahej and the country held by the Arab tribes in the vicinity of Aden, with whom the British have treaty relations.—A Turkish history and geographical account of Yemen, by Colonel Hadji Reshid Bey, entitled *Tarikh-i-Yemen ve-Sana*, was published in 1875 (2 vols., Constantinople).

YENISEI, a river of Siberia, traversing the central government of Yeniseisk from S. to N., and draining a basin of nearly 1,000,000 sq. m. It rises in Mongolia, and at first flows W. and then, after passing the Siberian frontier, nearly due N. to a wide estuary called the Yenisei gulf, an arm of the sea of Kara, in lat. 72° 20′ N., lon. 82° E. It is about 2,500 m. long, and receives from the right, besides many smaller tributaries, the Upper Tunguska or Angara, the Podkamennaya (Stony) or Middle Tunguska, the Lower Tunguska, and the Kureika, and from the left the Yelogui and some smaller streams. The towns of Minusinsk, Krasnoyarsk, Yeniseisk, and Turukhansk are on its banks. It is navigable for large ships to Turukhansk, but is generally obstructed by ice.

YENISEISK. I. A central government of Siberia, in the political division of East Siberia, bounded N. by the Arctic ocean, E. by Yakutsk and Irkutsk, S. by the Chinese empire, and W. by Tomsk, Tobolsk, and the gulf of Obi; area, 992,838 sq. m.; pop. in 1870, 372,862. Capital, Krasnoyarsk. The sea coast projects far into the Arctic ocean, terminating in Tcheliuskin or Northeast cape, the northernmost point of Asia, in lat. 77° 50′ N., lon. 105° E. From the Altai mountains in the south the surface slopes gradually toward the north. Besides the Yenisei and its tributaries, the only rivers of importance are the Anabara and Khatanga in the northeast, which flow directly into the Arctic ocean, and the Taz, which enters the gulf of Obi through the estuary or bay of Tazovsk. There are several lakes, the largest of which are Taimyr in the Taimyr peninsula and Yesei near the head waters of the Khatanga river. Some parts of the south are well wooded. Iron ore and salt are found in large quantities, and between the Yenisei and Angara is one of the richest gold-washing tracts in Siberia. Grain can be produced only in the valleys of the south. In the north many reindeer feed upon lichens; and about the centre of the government there is good pasture land, upon which large herds of cattle are kept. Game is abundant, particularly the fur-bearing animals. The population is composed of different aboriginal tribes, and some Cossacks and Russians, the latter being chiefly convicts. **II.** A town of the above government, on the left bank of the Yenisei, about 290 m. E. N. E. of Tomsk; pop. about 7,000. It has several churches, a monastery, and a nunnery, and is surrounded by an old rampart. It has an annual fair, and a considerable trade in furs. The town was founded in 1618.

YENISHEHR. See LARISSA.

YEW (A. S. *iw;* variously written by the old authors ewgh, ugh, and U, and in French *if*), the common name for species of *taxus* (the ancient name, supposed to be from Gr. τόξον, a bow), especially *T. baccata.* The yew is so unlike in its fruit to other genera of the pine family (*coniferæ*) that some have placed it and its allies in a separate order, but botanists at



Yew (Taxus baccata).

present include these in *coniferæ*, as a very distinct subfamily or tribe, the *taxineæ*. This subfamily includes, besides the yew, *Torreya*, *Salisburia* or gingko, and *cephalotaxus*, with a few other rarer genera. The yews are trees of medium size, with evergreen leaves, which are linear, flat, rigid, pointed at the apex, and mostly arranged in two rows. The flowers, usually diœcious, but sometimes monœcious, are axillary from scaly buds; the sterile aments are small, globular, and consist of a few stamens, each with three to eight anther cells beneath a shield-like scale (connective); the fertile flowers are solitary, and consist of merely a naked ovule, erect and sessile upon a ring-like disk, beneath which are several scaly bracts; after the ovule is fertilized and begins to develop into a seed, the disk upon which it is placed begins to grow, becoming cup-shaped, and gradually covering the ovule, and by the time the nut-like seed is ripe the disk has enclosed it, except a small opening at the top, and at the same time become fleshy, appearing like a pulpy (usually) red berry, which gives the specific name *T. baccata.* The common yew is a most variable tree, and in its typical form is known in this country as the English yew, though it is found all over central and in the mountains of southern Europe, and in Siberia, on the Himalaya, and in other parts of Asia; it presents numerous varieties, one of which is North American. The tree, though living to a great age, is seldom more than 30 ft. high, with a wide spread of branches and a very thick trunk; in England are many specimens remarkable for their age and great size, some now living being estimated at from 700 to 1,000 years or more old; biographies of a number of these are given by Loudon in his *Arboretum et Fruticetum Britannicum;* one of the finest is the Darley yew, in the churchyard of Darley in Derbyshire; this has the unusual height of 55 ft. with a spread of branches of 70 ft.; the trunk is 19 ft. 3 in. in diameter, and its age, as estimated from the diameter, over 1,300 years. The wood of the yew is very heavy, fine-grained, elastic, and durable; the heart wood is of a fine orange red or a deep brown, and the sap wood, which is very hard, is pure white, with different shades where the two join, and both are susceptible of a fine polish. Specimens containing the two are used for ornamental cabinet work, a purpose for which the wood is much employed; tables and other work made from it are considered more beautiful than those of mahogany; it is employed in the form of veneers, and used solid for various articles of turnery; its great strength adapts it for axle trees and other work where this quality is required; when set in the ground for fence and gate posts, it is practically indestructible, and it is never attacked by insects. Before firearms were introduced yew was in great request for bows, and various laws were enacted to preserve a supply of the material for military puposes; it has been suggested that the general planting of the tree in churchyards was for this reason, but it is more probable that, on account of the longevity of the tree, it was used by the Celtic priests as an emblem of immortality. In the ancient style of gardening, when trees were clipped into unnatural forms, the yew was a favorite subject for topiary work; at present it is used in England for screens and in groups, but its association with graveyards is still regarded by some as an objection to planting it as an ornamental tree. In this country it is not hardy in the northern states. The leaves are poisonous to man, and cattle have been killed by eating them; but the berries are generally regarded as harmless, though ill effects have been ascribed to them. The tree has produced many sports, and the lists

Yew Tree at Darley, Derbyshire, England.

of the European nurserymen give numerous varieties, differing in habit and color.—Our native yew, formerly regarded as a distinct species, *taxus Canadensis*, is now placed as var. *Canadensis* of *T. baccata*, and is known as the American yew, but more generally as the ground hemlock; its stem is prostrate and trails upon the ground or runs just below the surface, the branches straggling, ascending, and rarely more than 3 or 4 ft. high; in some localities it forms the principal undergrowth, and presents a pleasing mass of vivid green. Sometimes the branches grow in a circle, with an open space in the centre, as regularly as if they had been trained; in cultivation the fertile plant, with its abundant scarlet fruit in contrast with the dark green of the foliage, is a most beautiful object. Another variety (var. *fastigiata*), known as the Irish yew, has erect branches, and has proved in this country more hardy than the type. The yellow-berried yew differs only in the color of its fruit. The upright yew (var. *erecta*) is more hardy than the species. There are several dwarf, weeping, and variegated forms, among which there is none so beautiful as the golden yew (var. *variegata aurea*), in which the young growth in spring has its leaves edged with a bright golden yellow; there is also a silver-leaved variety, more hardy than the species, and producing a brilliant effect when planted in contrast with other evergreens. The Florida yew is a tree 10 to 20 ft. high, growing in middle and western Florida; it has very narrow, distinctly petioled, pointed leaves, which are revolute on the margins; it is not known to be hardy in more northern localities. The western yew of the Pacific coast (*T. brevifolia*) is found from Vancouver island to nearly the southern boundary of California, especially on the Sierra Nevada; it grows from 50 to 75 ft. high; some have regarded it as a form of the European yew, from which it mainly differs in its narrower, shorter, and thinner leaves, which are abruptly pointed, and have distinct petioles; it differs from the yew of the east in always assuming a tree-like form; its wood resembles that of the European yew; this is called *T. Lindleyana* in some English works. The Mexican yew, *T. globosa*, is a small tree with somewhat curved leaves, ending in a stiff, sharp point. This with two from Japan completes the list of species. The yews are propagated both by sowing the seed and by cuttings.

YEZDEGERD, or **Isdigerd,** the name of three Persian kings of the Sassanian dynasty.—**Yezdegerd I.** reigned from A. D. 399 to about 420. He maintained peace abroad, although the condition of the empire was favorable to the renewal of hostilities with Rome. He alternately persecuted the Magians and the Christians, according to changes in his own views, and few sovereigns have been more generally execrated.—**Yezdegerd II.** reigned from about 440 to 457. He declared war against the Romans and invaded their territory, but accepted proposals for peace from Theodosius II. After a nine years' war with the Ephthalites, a Tartar tribe on his N. frontier, he expelled their monarch. He compelled the Armenians by force of arms to accept Zoroastrianism; their patriarch Joseph and other bishops were martyred. In an expedition against the insurgent Ephthalites Yezdegerd was drawn into an ambush and defeated, and soon after died.—**Yezdegerd III.,** born about 617, reigned from 632 to 651. He at once had to contend with the Moslem invaders. In 636 was fought the battle of Cadesia (Kadisiyeh), lasting four days, in which the Persians were defeated and their renowned general Rustam was slain. In 637 Ctesiphon, the Persian capital, fell into the hands of the Arabs, and at Jalula soon after the Mohammedans were again victorious. In 641 Yezdegerd collected at Nehavend an army of 150,000 men, but, outwitted by Noman, a general of the caliph Omar, was defeated by a much inferior force. This battle overthrew the Sassanian power. Yezdegerd lived ten years a fugitive, and was at last slain by one of his own former subjects. (See SASSANIDÆ, and PERSIA.)

YEZO, or **Yesso,** formerly the name of the uncivilized part of Japan above lat. 38° N., now of one of the four large islands of Japan, between lat. 41° 24′ and 45° 31′ N., and lon. 139° 40′ and 146° 7′ E., separated from Saghalien or Karafto on the north by La Pérouse strait, and on the south from the main island of Japan by the narrow strait of Tsugaru; extreme length, 290 m.; breadth, 245 m.; estimated area, about 30,000 sq. m.; pop. about 125,000. The coast is bold and rocky, but indented with several good harbors. The surface generally is mountainous, with many volcanoes, solfataras, and hot springs. There are some small lakes and numerous mountain torrents. The principal river is the Ishikari, rising near the middle of the N. part of the island and flowing S. W. about 165 m. to Strogonoff bay. Bears, wolves, deer, and all kinds of sea fowl abound. The principal producions are coal, petroleum, salt, sulphur, timber (of which 33 valuable kinds are found), deer skins, dried fish, and fish oil. The population, including some Chinese, Europeans, and Americans, is settled chiefly in the south. The north is thinly inhabited by Ainos, who number about 20,000, living in a few fishing villages. The interior was entirely unsettled and unexplored till the present government took steps for colonizing the island, employing Americans, who have explored a great part of the country, built roads, laid out farms, and introduced stock and seeds from the United States. The chief towns are Hakodate (Hakodadi), Matsumaë, Esashi, and Sapporo. (See JAPAN.)

YOKOHAMA (Jap., Cross Strand), a seaport city on the E. side of the main island of Japan, on the W. shore of the bay of Yedo, 15 m. S. by W. of Tokio (Yedo); lat. 35° 26′ N., lon. 139°

39′ E.; pop. about 60,000, including 1,500 of the 2,500 Americans and Europeans resident in Japan, and 1,200 Chinese. It is the capital of the Kanagawa *ken* or prefecture. The city lies mostly on flat land backed by a line of bluffs built upon with many tasteful residences. The streets both in the foreign and native quarters are well paved, drained, lighted with gas, and lined with richly stocked shops, hongs, tea-firing godowns, and silk warehouses. Yokohama is the chief port of foreign commerce in Japan, six lines of steamers (Japanese, American, and European) making it their terminus or port of call. It is the great mart for the silk, tea, grain, and native produce and manufactures. It contains three foreign and four native Christian churches, four foreign and two native daily newspapers, five banks, four hospitals, large hotels, public gardens, and gas works, and is supplied with water brought in aqueducts. A railway 18 m. long connects it with Tokio. Telegraph lines to Yezo, Tokio, Kioto, Nagasaki, and thence to Shanghai, China, and Vladivostok in Siberia, unite it to Europe and America. The climate is very salubrious, and the surrounding scenery beautiful, Mt. Fuji and the bay, here 12 m. wide, with its indentations and evergreen bluffs, being striking features. The harbor is deep and capacious. The imports in 1874 amounted to $16,716,298, out of a total for the whole country of $24,223,629; exports, $12,578,573, out of a total of $20,001,637. Among the exports was tea to the United States to the amount of 17,016,316 lbs., valued at $5,107,800.—Until 1854, when Perry signed the American treaty with the shogun's envoys at this place, Yokohama was a small fishing village. By the first treaty of commerce, concluded by the American envoy Townsend Harris, July 29, 1858, it was opened to foreign trade and residence, and its growth has been rapid. The historic and natural interest of the vicinity make it the resort of thousands of tourists. Kanazawa, once a noted seat of learning, is 8 m. S. W.; and 2 m. further is Kamakura, the military capital of Japan from 1184 to 1574. The colossal copper image of Dai Butsu (Great Buddha), 50 ft. high, a work of high art, and the fine temple on Tsuruga Oka, are the chief relics of its mediæval glory. Its vicinity was a battle ground for centuries, it being the stronghold of the Minamoto, Hojo, and Ashikaga lines of shoguns in succession.

YOLO, a W. county of California, bordering N. W. on the Coast mountains, and E. on the Sacramento river, and watered by several small tributaries of that stream; area, 1,150 sq. m.; pop. in 1870, 9,899, of whom 395 were Chinese. The E. half is level; W. of this is a belt of slightly undulating prairie, gradually rising into the lower slopes of the Coast range. The level portion has mostly a rich alluvial soil. Agriculture is the principal industry. It is traversed by the California Pacific railroad. The chief productions in 1870 were 2,025,612 bushels of wheat, 499,926 of barley, 15,520 of potatoes, 10,250 gallons of wine, 437,048 lbs. of wool, 186,929 of butter, and 27,186 tons of hay. There were 8,739 horses, 1,206 mules and asses, 12,189 cattle, 83,087 sheep, and 26,855 swine. Capital, Woodland.

YONGE, Charles Duke, an English author, born in November, 1812. He is the son of the Rev. Charles Yonge, lower master of Eton college, and graduated at Oxford in 1835. He is now (1876) professor of history and English literature in Queen's college, Belfast. He has published several philological works, including an English-Greek lexicon (1849; 5th ed., 1865; American ed. edited by Prof. Henry Drisler, New York, 1870), a "Phraseological English-Latin and Latin-English Dictionary" (2 vols., 1855-'6), and a "Dictionary of Latin Epithets" (1856); "The History of England" (1856); "Parallel Lives of Ancient and Modern Heroes" (1858; republished under the title "Great and Brave in History," 1865); "Life of the Duke of Wellington" (2 vols., 1860); "History of the British Navy" (2 vols., 1863); "France under the Bourbons" (4 vols., 1866-'7); "Life and Administration of the Second Earl of Liverpool" (3 vols., 1868); "Three Centuries of Modern History" (1872); "History of the English Revolution of 1688" (1874); and "Life of Marie Antoinette" (2 vols., 1876). He has also edited or translated several classical works.

YONGE, Charlotte Mary, an English authoress, born at Otterbourne, Hampshire, in 1823. Her father was an army officer. She published "Abbey Church, or Self-Control and Self-Conceit," in 1844, which was followed by several novels in the interest of high church doctrines, and by some volumes of history for the young, entitled "Kings of England" (1848; 7th ed., 1862) and "Landmarks of History" (3 vols., 1852-'7). In 1853 she produced "The Heir of Redclyffe," a novel, which had a very wide popularity, and reached a 17th edition in 1868. She gave £2,000, the profits of "Daisy Chain" (2 vols., 1856), to the erection of a missionary college at Auckland, New Zealand. She has published more than 30 novels and tales, 10 works of history and biography, and several miscellaneous works. Among the more recent are "History of Christian Names" (2 vols., 1863); "The Story of English Missionary Workers" (1871); "Life of Bishop Patterson, of the Melanesian Islands" (2 vols., 1873); "Stories of English History" (1874); and "My Young Alcides" (1876).

YONGH, Vanayl de. See SAINT-ELME.

YONKERS, a city of Westchester co., New York, on the E. bank of the Hudson river, joining New York city on the south, 16 m. N. of the city hall; pop. in 1875, 17,269. The built up portion is picturesquely situated on rising ground adjacent to the river, opposite the Palisades, is well shaded, and has numerous fine residences with handsome grounds. The old Philipse manor house, built partly in

1682 and partly in 1745, is used as the city hall. The city is lighted with gas, and water works costing $750,000 are to go into operation in September, 1876. The water is to be pumped from two streams within the city limits into a reservoir containing 400,000,000 gallons, 297 ft. above the Hudson. The Hudson River railroad passes along the bank of the river, the New York, Boston, and Montreal through the interior parts, and the New York and Harlem along the E. border. The Neperhan or Saw Mill river, entering the Hudson at this point, furnishes water power. There are three manufactories of felt hats, one of felt robes and cloths, two of sewing silk, one of sewing silk and ribbons, one of lead pencils, one of carpets, one of elevators, two of mowing machines, one of barrels, one of sugar, one of leather, one of boats, two machine shops, an iron foundery, a brass foundery, and a brewery. The city contains two national banks, two savings banks, four public schools, two Roman Catholic schools, and five private schools. Three weekly newspapers are published. There are 16 churches, viz.: 2 Baptist, 3 Episcopal, 1 Lutheran, 3 Methodist, 3 Presbyterian, 1 Reformed, 2 Roman Catholic, and 1 Unitarian.—Yonkers was settled about 1650, and for about a century prior to the revolution was a manor in the possession of the Philipse family. It was organized as a town in 1788. In 1855 the village of Yonkers was incorporated. In 1872 the town was divided, the N. portion being erected into the city of Yonkers and the S. portion set off as the town of Kingsbridge, which became a part of New York city in 1874.

YONNE, a N. E. department of France, formed from parts of Burgundy, Champagne, and Orléanais, bordering on the departments of Seine-et-Marne, Aube, Côte-d'Or, Nièvre, and Loiret; area, 2,868 sq. m.; pop. in 1872, 363,608. It takes its name from the river Yonne (anc. *Icauna*), which rises in the E. part of Nièvre, flows N. through the middle of Yonne, and joins the Seine at Montereau in the S. part of Seine-et-Marne, after a course of about 170 m. It is navigable as high as Auxerre. Its affluents in the department include the Cure, Armançon, and Vannes. The Burgundian canal runs through the E. part. The surface is undulating and the soil excellent. The department is rich in cattle, horses, sheep, grain, and hemp. The chief exports are red and white wines, timber, and coal. Iron, lithographic stones, and ochre are the principal mineral products, and woollen and cotton goods, beet sugar, and glass are manufactured. Yonne is divided into the arrondissements of Auxerre, Avallon, Joigny, Sens, and Tonnerre. Capital, Auxerre.

YORK, the name of five counties in the United States. **I.** The S. W. county of Maine, bounded S. by the Atlantic ocean, and W. and S. W. by New Hampshire, from which it is separated by Salmon Falls river, and the Piscataqua, and drained by the Saco and other streams; area, 818 sq. m.; pop. in 1870, 60,174. The surface is uneven, the soil of the sea coast is rocky and sterile, and that of the interior fertile. The county is intersected by several railroads. The chief productions in 1870 were 14,139 bushels of wheat, 175,924 of Indian corn, 57,021 of oats, 24,348 of barley, 23,205 of peas and beans, 530,223 of potatoes, 1,115,782 lbs. of butter, 32,995 of cheese, 47,865 of wool, and 78,632 tons of hay. There were 5,191 horses, 12,869 milch cows, 17,272 other cattle, 14,356 sheep, and 4,447 swine. The whole number of manufactories was 425, having an aggregate capital of $6,350,524; value of products, $10,350,982. The most important were 15 of boots and shoes, 11 of wooden boxes, 9 of bricks, 21 of carriages and wagons, 10 of clothing, 7 of cotton goods, 8 of machinery, 11 of woollens, 1 of worsted goods, 60 saw mills, 3 flour mills, 11 tanneries, 8 currying establishments, 1 print works, and 2 ship yards. Capital, Alfred. **II.** A S. E. county of Pennsylvania, bordering on Maryland and bounded N. E. by the Susquehanna river; area, 864 sq. m.; pop. in 1870, 76,134. The surface is generally hilly, diversified by mountains in the W. part, and the soil is highly fertile. There are extensive quarries of limestone, slate, and sandstone. It is intersected by the Northern Central railroad and its Hanover and Wrightsville branches, and the Susquehanna canal passes along the E. border. The chief productions in 1870 were 1,129,750 bushels of wheat, 121,035 of rye, 1,531,541 of Indian corn, 1,444,763 of oats, 44,092 of buckwheat, 248,461 of Irish and 29,905 of sweet potatoes, 1,734,895 lbs. of butter, 39,093 of wool, 527,808 of tobacco, and 92,929 tons of hay. There were on farms 14,707 horses, 2,642 mules and asses, 23,269 milch cows, 20,201 other cattle, 14,068 sheep, and 40,083 swine. The whole number of manufactories was 1,111, having an aggregate capital of $3,251,400; value of products, $7,028,934. The most important were 14 of agricultural implements, 15 of bricks, 24 of rag carpets, 49 of carriages and wagons, 3 of cars, 9 of iron, 49 of lime, 7 of machinery, 2 of paper, 10 of stone and earthen ware, 51 of cigars, 2 of whips, 8 of woollens, 42 flour mills, 19 saw mills, 27 tanneries, and 24 currying establishments. Capital, York. **III.** A S. E. county of Virginia, forming part of the peninsula between York and James rivers, and bounded E. by York river and Chesapeake bay; area, 150 sq. m.; pop. in 1870, 7,198, of whom 4,691 were colored. The surface is generally undulating, and the soil is fertile. The chief productions in 1870 were 3,289 bushels of wheat, 107,103 of Indian corn, 12,060 of oats, 12,416 of Irish and 12,954 sweet potatoes, and 18,411 lbs. of butter. There were 433 horses, 951 milch cows, 1,440 other cattle, 708 sheep, and 4,626 swine; 2 flour mills, and 1 saw mill. Capital, Yorktown. **IV.** A N. county of South Carolina, bordering on North Carolina, bounded E. by the Catawba river and W. by Broad river; area, 800 sq. m.; pop. in 1870, 24,286, of whom 12,167 were colored; in 1875, 31,639, of whom 17,900 were colored. The surface is hilly or mountainous, and the soil is moderately fertile. Iron ore is very abundant, and gold, manganese, and limestone are found. It is intersected by the Charlotte, Columbia, and Augusta, the King's Mountain, and the Atlanta and Richmond Air Line railroads. The chief productions in 1870 were 57,839 bushels of wheat, 353,174 of Indian corn, 46,114 of oats, 7,141 of Irish and 18,435 of sweet potatoes, 130,633 lbs. of butter, 8,834 of wool, and 6,010 bales of cotton. There were 1,856 horses, 2,007 mules and asses, 3,467 milch cows, 4,171 other cattle, 5,686 sheep, and 3,774 swine; 3 manufactories of carriages and wagons, 1 of forged and rolled iron, and 12 flour mills. Capital, Yorkville. **V.** A S. E. county of Nebraska, intersected by the Middle and West forks of Big Blue river; area, 576 sq. m.; pop. in 1870, 604; in 1875, 5,266. The surface is undulating and the soil fertile. The chief productions in 1870 were 8,876 bushels of wheat, 10,700 of Indian corn, 4,399 of oats, 3,680 of potatoes, 7,656 lbs. of butter, and 825 tons of hay. There were 208 horses, 158 milch cows, 237 other cattle, and 295 swine. Capital, York.

YORK. **I.** A county of Ontario, Canada, bordering on Lake Ontario on the south and Lake Simcoe on the north; area, 913 sq. m.; pop. in 1871, 115,974, of whom 47,151 were of English, 41,168 of Irish, 17,044 of Scotch, 6,788 of German, and 1,483 of French origin or descent. Several railroads centre at Toronto, the capital of the county and province. **II.** A S. W. county of New Brunswick, Canada, separated from Maine by the St. Croix river and Grand lake, and intersected by the St. John river; area, 3,472 sq. m.; pop. in 1871, 27,140, of whom 9,695 were of Irish, 9,577 of English, 3,917 of Scotch, and 1,882 of Dutch origin or descent. The surface is dotted with numerous lakes, and is diversified with mountains and valleys. The soil is fertile. Much of the county is covered with forests. It is traversed by the New Brunswick and Canada, the European and North American, the New Brunswick, and the Fredericton railways. Capital, Fredericton, the capital of the province.

YORK, a city and the county seat of York co., Pennsylvania, on Codorus creek and the Northern Central railroad, by which it is 28 m. S. S. E. of Harrisburg and 58 m. N. of Baltimore; pop. in 1850, 6,863; in 1860, 8,605; in 1870, 11,003. It is handsomely situated in a rich agricultural region, and is regularly laid out, with streets crossing each other at right angles. The court house is of brick, with granite front and Corinthian pillars. The Frederick (Maryland) division of the Pennsylvania railroad passes through the city, and the Peachbottom railroad extends to Oxford, Chester co. York contains several large car shops, some of the most extensive manufactories of agricultural implements in the country, a shoe and a match factory, and the Codorus paper mills. There are five national banks, a savings institution, and a private banking house, with an aggregate capital of $1,500,000. Besides public schools, there are the York county academy for boys, Cottage Hill college for young ladies, and the York collegiate institute for both sexes. One daily and six weekly newspapers are published. One of the weeklies is printed in German. There are 21 churches, most of which have fine edifices, viz.: 1 Baptist, 1 Episcopal, 2 Evangelical, 1 Friends', 5 Lutheran, 2 Methodist, 1 Moravian, 1 Presbyterian, 3 Reformed, 2 Roman Catholic, and 2 United Brethren.—York was settled in 1741 and incorporated in 1787. The continental congress sat here from Sept. 30, 1777, to July, 1778.

YORK (anc. *Eboracum*), a city and the capital of Yorkshire, England, on both sides of the river Ouse, at its junction with the Foss, 172 m. N. N. W. of London, and 58 m. N. E. of Manchester; pop. in 1871, 43,796. The Ouse is here crossed by a handsome bridge, and there are several bridges across the Foss. There are several suburbs, mostly on the opposite side of the Foss. The city proper is nearly 3 m. in circuit, and is partly enclosed by ancient walls, which were originally erected by the Romans. It is entered by four principal gates, and the streets are generally narrow, but several have been improved and widened. York minster, or the cathedral, is by many considered the finest church in England. Its history begins in the 7th century, but the present edifice was commenced in the second half of the 12th century and completed in 1472. It is in the form of a cross, with a central square tower 213 ft. high, and two other towers, each 196 ft. high, flanking the W. front, which is highly ornamented. The extreme length is 524 ft., and the extreme breadth across the transepts 249 ft. The E. window is 78 ft. high and 32 ft. wide, and filled with stained glass representing about 200 historical events. An elaborate screen contains statues of all the kings of England from William I. to Henry VI.; and upon this screen is the organ, one of the finest in the kingdom. The cathedral has a peal of 12 bells, one of which weighs 11½ tons, and is the largest in Great Britain. The edifice has been twice nearly destroyed by fire, in 1829 and in 1840. The archbishop's palace is on the N. side of the cathedral. It was built toward the close of the 12th century, and is now used as the library of the dean and chapter; and the residence of the archbishop is at Bishopthorpe, a little distance from the city. In 1872 there were 52 places of worship, of which 27 belonged to the church of England, and 12 to various denominations of Methodists. York has numerous schools, an ancient Gothic guildhall and large mansion house, the valuable museum of the Yorkshire philosophical society, public baths, a castle occupied by the assize courts and the county prison, a large modern jail, a merchants' hall, handsome assembly rooms, a concert room, theatre, lecture hall, numerous charitable institutions, and extensive cavalry barracks. The manufactures are not very important; and though the means of communication are very extensive, the trade of the town is mostly local. The archbishop of York is primate of England, though inferior in rank to the archbishop of Canterbury, who is styled primate of all England. His ecclesiastical province includes the dioceses of Carlisle, Chester, Durham, Manchester, Ripon, Soder and Man, and York.—During the Roman dominion York was the seat of the general government of the island. The emperors Septimius Severus and Constantius Chlorus died here, and Constantine the Great was here proclaimed emperor. Under the Saxon heptarchy it was the capital of Northumbria, and afterward of Deira. The citizens joined the Scots and Danes against William the Conqueror, who after their defeat razed the city to the ground. It was partially rebuilt, but destroyed by fire in 1137. During the massacres of Jews which took place in England after the coronation of Richard I., several hundred Jewish inhabitants of York, having in vain attempted to defend themselves in the castle, slew their wives and children, set fire to the houses, and perished in the flames. Fairfax captured York from the royalists in 1644, and in 1688 James II., for its opposition to the arbitrary measures of the crown, took away its charter.

York Minster.

YORK, Duke of, a title formerly conferred on younger sons of the kings of England. It was first borne by Edmund Plantagenet, fifth son of Edward III., who was created duke of York Aug. 6, 1385, and died in 1402. He was the founder of the house of York, the house of the white rose; while his elder brother John of Gaunt, fourth son of Edward III., created duke of Lancaster Nov. 13, 1362, was the founder of the rival house of the red rose; and their respective claims were urged for nearly half a century in the so-called wars of the roses. (See England, vol. vi., p. 610.) The first duke of York was succeeded by his son Edward, who fell at Agincourt in 1415, and was succeeded by his nephew Richard, son of Anne Mortimer, who was great-granddaughter of Lionel duke of Clarence, third son of Edward III. It was by virtue of this descent from the duke of Clarence that the house alleged its superior right over that of Lancaster, which was descended from the fourth son of Edward III. The title was subsequently borne by Edward Plantagenet, afterward Edward IV.; Richard Plantagenet, supposed to have been murdered in 1483 by his uncle Richard III.; Henry Tudor, afterward Henry VIII.; Charles Stuart, afterward Charles I.; and James Stuart, afterward James II. It was conferred by the pretender, James III., on his second son Henry Benedict, known in history as Cardinal York, the last of the royal family of the Stuarts. (See Stuart, Henry Benedict Maria Clement.)—After the accession of the house of Hanover to the British throne, George I. created, July 5, 1716, his brother Ernest Augustus, prince-bishop of Osnabrück, duke of York and Albany. He died in 1728, and Edward Augustus, the second son of Frederick, prince of Wales, received the title in 1760, but died childless in 1767.—The last duke of York and Albany was Frederick, second son of George III. (born Aug. 16, 1763, died Jan. 5, 1827). He received the title Nov. 29, 1784. He had at the age of six months received the dignity of prince-bishop of Osnabrück, that bishopric being held alternately by a Catholic and a Protestant. It was secularized in 1803, and became a part of Hanover. He returned to England in 1787 from the continent, where he had gone to study the military art, and took his seat in the house of lords. In 1789 he fought with pistols on Wimbledon common a duel with Col. Lennox, afterward duke of Richmond, who challenged him because he refused to retract or explain words uttered in the house; the bullet of Col. Lennox grazed his hair, and he then fired in the air. In 1791 he went to Prussia, and on Dec. 29 married Frederica, eldest daughter of Frederick William II., from whom he separated a few years afterward. In 1793 he was appointed to command a British corps in the Netherlands, and took part in the siege of Valenciennes, but was defeated several times, and returned to England in April, 1795, where in February he had been made field marshal. On April 5, 1798, he became commander-in-chief of the British army. In 1799 he commanded an expedition in Holland. On Sept. 19 he was defeated by Brune near Bergen, and on Oct. 6 near Alkmaar, where on Oct. 18 he signed a convention, by which the British agreed to surrender 8,000 prisoners of war and evacuate the territories of the republic. On Jan. 27, 1809, in consequence of disclosures by his mistress, he was arraigned in the house of commons for corrupt disposal of military commissions. (See CLARKE, MARY ANNE.) He was acquitted by 278 votes against 196, but so great was the scandal of the investigation that he resigned his office of commander-in-chief; to which, however, he was restored by the prince regent, May 15, 1811. By the death of the princess Charlotte, Nov. 6, 1817, he became heir presumptive to the throne. In 1819 he was appointed keeper of the person of his insane father. His last speech in the house of lords was delivered in 1825 against Catholic emancipation.

YORKE, Charles, an English lawyer, brother of Philip Yorke, second earl of Hardwicke, born Dec. 30, 1722, died Jan. 20, 1770. He was called to the bar in 1747, and represented Reigate in parliament from 1747 to 1768, when he was elected for Cambridge university. He was appointed solicitor general in 1756, and he was attorney general in 1762–'3 and 1765–'70. He was appointed lord high chancellor Jan. 17, 1770, but died suddenly three days afterward, it is supposed by suicide, while his patent for the peerage, under the title of Baron Morden, was being executed. He published "Some Considerations on the Law of Forfeiture for High Treason," &c., reviewing the act of parliament making it treason to correspond with the pretender's sons or any of their agents (8vo, London, 1745; 5th ed., 1795), and wrote the letters signed C. in the "Athenian Letters" (1741–'3), of which he was joint author with his brother and others. (See HARDWICKE, EARLS OF.)

YORK RIVER, a river of E. Virginia, formed by the union of the Mattapony and Pamunkey at West Point, at the S. E. extremity of King William co. It flows S. E. 40 m., and falls into Chesapeake bay about 15 m. N. of the mouth of the James river. It is so broad from West Point downward as to present almost the appearance of a bay. At its mouth it is about 3 m. across, and in some places it is still wider. It is navigable to its head.

YORKSHIRE, the largest county of England, bordering on Durham, the North sea, the estuary of the Humber, and the counties of Lincoln, Nottingham, Derby, Chester, Lancaster, and Westmoreland; area, 6,066 sq. m. It is divided into the North, East, and West Ridings (Anglo-Saxon, *trithing* or *thriding*, a third), each with its own government and officers; and there was formerly another small division called the "ainsty" of York, near the centre of the shire, which has been incorporated with the West Riding; pop. in 1871, of the North Riding, 291,589; East Riding, 269,505; West Riding, 1,831,223; city of York, 43,796; total, 2,436,113. With the exception of the part lying between Bridlington bay and Spurn head, the coast is high and bold, rising generally between 70 and 300 ft., and in one spot reaching 893 ft. Besides the harbors afforded by the rivers Tees and Humber and their estuaries, the most important are those of Scarborough and Whitby. The greater part of the drainage of the county flows into the Humber by the river Ouse; and of the remainder a small portion flows by the Ribble to the Irish sea, and by the Tees and other streams to the North sea. An extensive valley extends from the N. part of the county to the Humber at the south, and is enclosed on the E. and W. sides by moorlands, which on the E. side are from 20 to 30 m. broad, and in some places reach the height of 1,200 or 1,400 ft., while on the west the country gradually increases in elevation, the loftiest point, Bow Fell in the Pennine chain, being 2,911 ft. above the sea. In the S. part of the E. side the moors, here called wolds, gradually become lower, and do not extend to the coast, but between them and the sea there is a large alluvial tract called Holderness. The central valley, as it descends from the north, becomes gradually wider, and at length flat and swampy as it approaches the Humber. The vale of York, the districts of Holderness and Cleveland, and several other extensive tracts, are exceedingly fertile; but a large part of the wolds is barren, or yields but scanty crops. Coal, iron, copper, lead, freestone, limestone, and alum are all found. Great attention is paid to the breeding of horses, horned cattle, and sheep. The iron works at Low Moor, Rotherham, and Bowling are on a very large scale; and the manufacture of hardware, cutlery, and plated ware is carried on most extensively, more particularly at Sheffield. The manufactures are almost wholly confined to a district of about 40 by 20 m. in the West Riding, and include cotton, woollens, linen, and silk. Numerous railway lines intersect the county. The capital is York, and the other important towns are Sheffield, Leeds, Huddersfield, Barnsley, Hull, Whitby, Bradford, Scarborough, Halifax, Doncaster, Pontefract, Great Preston, Ripon, Tadcaster, Wakefield, and Thirsk.

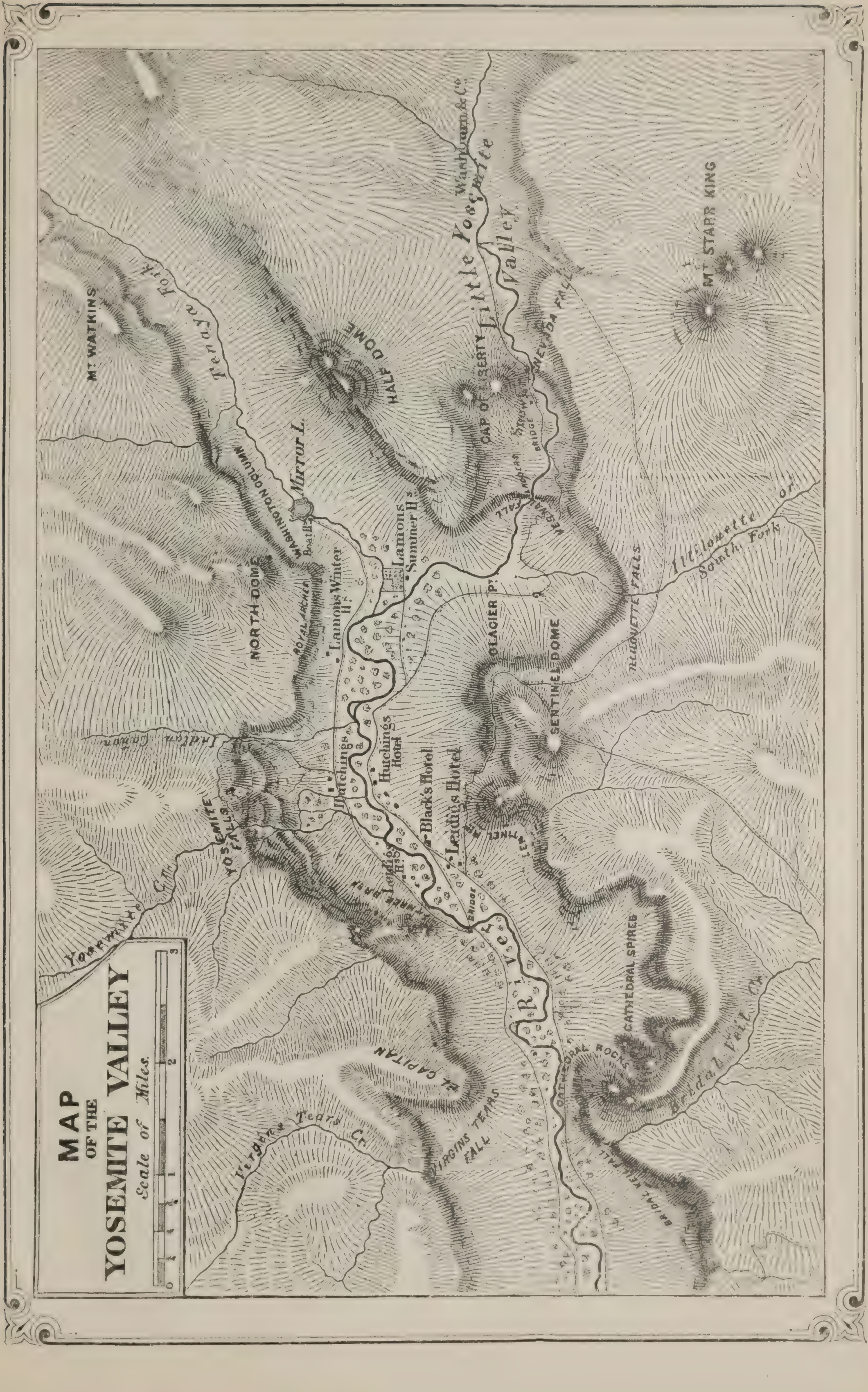
YORKTOWN, a post village, port of entry, and the capital of York co., Virginia, on the right bank of the York river, 10 m. from its mouth and 60 m. E. S. E. of Richmond; pop. about 1,000. It has a white and a colored school, an Episcopal church, and two Baptist churches (colored). It is chiefly noted for its two memorable sieges, in 1781 and 1862. On Aug. 1, 1781, Lord Cornwallis, in obedience to orders from Sir Henry Clinton to occupy a strong defensible position in Virginia, established himself at Yorktown with his whole army of about 8,000 men, supported by several frigates and smaller vessels which were anchored in York river. He fortified the place by redoubts and batteries on the land side, connected by a line of intrenchments extending completely around the village, and by a line of batteries along the river. The place was further defended by a series of outworks, with redoubts strengthened by abatis, and field works mounted with cannon. Gloucester point, on the other side of the river, was also strongly fortified. In the latter part of September the combined American and French forces effected a junction with Lafayette at Williamsburg, whence, under the command of Washington, they marched on the 28th to the investment of Yorktown. The whole besieging force amounted to about 16,000 men, of whom 7,000 were French and the remainder continentals and militia. The British abandoned their outworks at the approach of the allies, and on the 30th the investment of the town was completed. On Oct. 9 the first parallel was established, and several heavy batteries opened with great effect upon the enemy, dismounting a number of their guns, and destroying on the night of the 10th a frigate and three large transports. On the 11th the second parallel was opened; but as the working parties were greatly annoyed by an enfilading fire from two redoubts, a bold and successful attack was made upon them on the night of the 14th by two detachments, one American and one French, and the captured works were included in the parallel. The French loss in killed and wounded was nearly 100; that of the Americans was much less. The position of Cornwallis now became exceedingly critical, cut off from receiving reënforcements, or from escaping by sea, by the presence of the French fleet of 37 ships under De Grasse in Chesapeake bay. He made a sortie on the 16th, which proved a complete failure. On the 17th he proposed to capitulate, and the terms having been arranged, he surrendered on the 19th his whole force, consisting of 7,247 regular troops, 840 sailors, and 106 guns. The total British loss during the siege amounted to more than 350. This virtually decided the struggle for independence in favor of the Americans.—The second siege of Yorktown was begun by the United States troops under Gen. McClellan on April 5, 1862, and continued till May 4. (See CHICKAHOMINY, vol. iv., p. 410.)

YORK VON WARTENBURG, Hans David Ludwig, count, a Prussian soldier, born in Potsdam, Sept. 26, 1759, died at Klein-Oels, Silesia, Oct. 4, 1830. He belonged to an old English family settled in Pomerania. After eight years' military service, he was cashiered for insubordination, and held in prison in 1780–'81. He then enlisted in the Dutch army, and served in India in 1783–'4. In 1786 he was reinstated in the Prussian army, and in 1807 became major general, after being wounded and captured at Lübeck and detained for a year by the French. In the campaign of 1812 in Russia he finally became chief commander of the Prussian auxiliary troops in Napoleon's army of invasion. On Dec. 30 he concluded an agreement with Diebitsch and Clausewitz to remain neutral; the king of Prussia, still fearing Napoleon, officially disavowed this convention, but employed York in organizing the landwehr and the other forces. On the outbreak of the Prussian war against Napoleon he was placed at the head of the first corps, and on April 5, 1813, defeated Eugène de Beauharnais at Dannigkow; on May 19 he achieved another success at Weissig, and on the 21st at Bautzen he covered the retreat. Pending the truce, his corps was assigned to Blücher's command in Silesia. He took a decisive part in the battle on the Katzbach, Aug. 26, and defeated Bertrand at Wartenburg, Oct. 3, whence he received his title of count. During the battle of Leipsic, Oct. 16, he defeated Marmont at Möckern. On Feb. 11, 1814, at Montmirail, he saved the corps of Gen. Sacken, which had rashly engaged Napoleon, and on March 9 distinguished himself at Laon. After Napoleon's return from Elba he was assigned to the reserve corps, and he repeatedly offered his resignation, which was not accepted till the restoration of peace. He was made field marshal in 1821. A statue of York by Rauch has been erected in Berlin.—See Droysen's *Leben des Feldmarschalls Grafen York von Wartenburg* (3 vols., 3d ed., Berlin, 1851).

YORUBA, or **Yarriba,** a country of Africa, lying N. of the bight of Benin and W. of the Niger, between lat. 7° and 9° 30′ N. and lon. 2° and 5° 30′ E.; area, about 20,000 sq. m.; pop. estimated at upward of 2,000,000. In the early part of the present century it formed one kingdom, extending from the river Mussa on the north to near the bight of Benin on the south, and from the Niger on the east to Dahomey on the west. The capital was Katunga. By the invasions of the Foolahs the capital was destroyed and the kingdom greatly reduced in extent. A new capital considerably to the south of Katunga was founded, called Oyo, where the present king of Yoruba resides. Many of the states over which he claims dominion are practically independent. No portion of Africa contains so many populous cities as Yoruba. The principal are Ilorin, Ibadan, Ogboomosho, and Ijaye, with populations varying from 40,000 to 70,000. They are generally surrounded by walls of clay, often including much farm land. The houses are generally square, built of clay, and thatched with straw. Ilorin, the largest city, carries on an extensive commerce. The surface of the country is undulating, averaging about 1,000 ft. above the sea; the N. part is hilly. Much of the country is covered with forests of gigantic trees, with a dense underwood, through which paths not more than 1½ ft. wide are cut for caravans. The Yoruba race are of a clear brown complexion, with features rather European than negro. They are perhaps the most industrious and intelligent native Africans, and are often good mechanics. The principal article of export is palm oil, which they exchange for powder, brandy, and coarse European fabrics. The people are mostly heathen, but many of those who have been subdued by the Foolahs have become Mohammedans. Among the others Christianity has made some progress, and a Christian mission has been established at Ibadan.—See "Seventeen Years in the Yoruba Country," from the journals and letters of Anna Hinderer (London, 1872).

YOSEMITE, a valley in Mariposa co., California, through which winds the Merced river, about 155 m. E. by S. of San Francisco, unequalled for the grandeur of its scenery and the magnificence of its waterfalls. It is nearly in the centre of the state N. and S., and just midway between the E. and W. bases of the Sierra Nevada, here a little more than 70 m. wide. It is nearly level, about 6 m. long by ½ m. to 1 m. wide, and nearly a mile in perpendicular depth below the general level of the adjacent region. Its general direction is N. E. by E. and S. W. by W., nearly at right angles with the general trend of the mountains; its elevation above the sea is 3,950 ft. Its granite walls are nearly vertical; their color is a light gray, reflecting brilliantly white in the sunlight, occasionally varied with veins of a brighter or deeper hue. In places stripes of a darker color, gray, brown, and black, are produced by the flowing down of water carrying organic matter. Various species of trees and plants occur in the valley. In winter it is inaccessible, except on snow shoes; in summer the nights are cool, but the thermometer almost always rises above 80° in the middle of the day in June and July. There are several hotels for the accommodation of tourists. The valley is reached by stage or stage and horseback (about 90 m.) from Merced, Milton, and Oakdale, on branches of the Central Pacific railroad. The principal objects of interest will be described proceeding up the valley. The first on the right is the Bridal Veil fall, formed by a creek of the same name, which is precipitated over the cliffs in one leap of 630 ft. perpendicular upon a slope, down which it rushes in a series of cascades for a perpendicular distance of nearly 300 ft. The effect from the valley is as of a vertical fall of 900 ft., the base being concealed by trees. The column of water sways to and fro in the wind, seeming in the distance to flutter like a white veil. A little higher up is Cathedral rock, a prominent and massively sculptured pile of granite, the summit of which is 2,660 ft. above the valley. Above this are the "Spires," isolated columns of granite at least 500 ft. high, standing out from, but connected at the base with, the walls of the valley. Still further up a point of rocks projects into the valley, terminating in a slender mass of granite somewhat resembling an obelisk. This is known as Sentinel rock. Its entire height is 3,043 ft.; the obelisk form continues down for 1,000 ft. or more from the summit, below which the rock is united with the wall of the valley. A short distance above is Glacier point, from which one of the finest views in the valley may be obtained. Back of Sentinel rock is Sentinel dome, 4,150

Yosemite Valley.


MAP
OF THE
YOSEMITE VALLEY
Scale of Miles.
0
1
2
3
MT WATKINS
Tenaya Fork
HALF DOME
Mirror L.
WASHINGTON COLUMN
Boat H.
ROYAL ARCHES
NORTH DOME
Indian Cañon
YOSEMITE FALLS
Yosemite Cr.
Lamons Winter H.
Lamons
Summer H.s
Hutchings
Hutchings Hotel
Black's Hotel
Leidig's Hotel
Leidig's H.
THREE BROS
BRIDGE
River
EL CAPITAN
VIRGINS TEARS FALL
Virgins Tears Cr.
CATHEDRAL ROCKS
CATHEDRAL SPIRES
Bridal Veil Cr.
BRIDAL VEIL FALL
SENTINEL
SENTINEL DOME
GLACIER PT.
ILLILOUETTE FALLS
Illilouette or South Fork
VERNAL FALL
BRIDGE
SNOW'S
NEVADA FALL
CAP OF LIBERTY
Little Yosemite Valley
Washburn & Co.
MT STARR KING

Yosemite Fall.

ft. above the valley, which commands a fine view of the Yosemite fall. On the left side of the valley, opposite the Bridal Veil fall, is the Virgin's Tears fall, where the creek of that name leaps over the wall more than 1,000 ft. Just above is El Capitan, an immense block of granite projecting into the valley and presenting an almost vertical edge 3,300 ft. high. Further up, and nearly opposite Sentinel rock, are the Three Brothers, a group of rocks rising one behind another, the highest being 3,830 ft., and from its summit affording a splendid view of the valley and surroundings. Above the Three Brothers is the principal fall, the Yosemite, formed by a creek of the same name. The vertical height of the lip of the fall is about 2,600 ft. There is first a vertical descent of 1,500 ft., when the water strikes a shelf or recess, whence it makes in a series of cascades a fall equal to 626 ft. perpendicular, and then gives a final plunge of about 400 ft. The different parts of the fall being nearly in one vertical plane, the effect is described as being almost as grand as, and perhaps more picturesque than, if the water made but a single leap from the top of the cliff to the level of the valley. A striking feature of the Yosemite fall, believed to be peculiar to it and the Bridal Veil fall, is the vibratory motion of the upper portion under the varying pressure of the wind. The stream at the summit, at a medium stage of water, is estimated to be 20 ft. wide and 2 ft. in average depth. The Yosemite fall is believed to surpass in vertical height all others having nearly the same body of water. A little E. of it the cliff rises in a bold peak 3,030 ft. above the valley. About 2 m. above the fall the valley branches into three cañons, formed by the Merced river in the centre, the Tenaya fork on the left or N. W., and the Illilouette or South fork on the right or S. W. (not to be confounded with the main South fork of the Merced, which is below the Yosemite valley). N. of the Tenaya fork, near where it enters the main stream, are an immense arched cavity called the Royal Arches, and a rounded columnar mass of rock called the Washington column, and back of these the North dome, a dome-shaped mass of granite attaining an elevation of 3,568 ft. above the valley. Between the Tenaya and the Merced is the Half Dome, an apparently inaccessible crest of granite rising 4,737 ft. above the valley, in which it is one of the most imposing objects. Mirror lake, an expansion of the Tenaya fork, is a beautiful sheet of water. In the cañon of the Merced are two falls, the lower, called the Vernal fall, with a perpendicular descent of about 400 ft., and the upper, called the Nevada fall, not quite perpendicular, with a height of about 600 ft. N. of the river near the Nevada fall is an immense mass of rock, isolated and nearly perpendicular on all sides, called the Cap of Liberty, which rises some 2,000 ft. above its base. In the Illilouette there is a fall estimated to be 600 ft. high. Only two of the principal falls, the Vernal and Nevada, continue in existence throughout the season; the Yosemite and Bridal Veil almost disappear by August or September. The most favorable months for visiting the valley are May, June, and July, before the creeks are dried up. On the Merced above the Nevada fall is the Little Yosemite valley, about 4 m. long and from ½ m. to 1 m. wide, 2,130 ft. above the Yosemite valley proper, of which it may be regarded as a continuation. The high Sierra adjacent to the valley abounds in points of interest. About 16 m. S. is the Mariposa grove of big trees, and about 18 m. N. by W. the Hetch-Hetchy valley on the Tuolumne river, smaller than the Yosemite, but similar to it in character.—The Yosemite valley was first entered by white men in 1851, when an expedition was organized to drive out the Indians who made it their stronghold. It was first visited by tourists in 1855. The first house was built in 1856. In 1864 an act of congress was passed granting the valley to the state of California, upon condition that the premises should be held for public use, resort, and recreation, and should be inalienable for all time. The governor soon after appointed commissioners to have the management of the valley, and the state legislature at its next session accepted the grant. The name Yosemite is an Indian word signifying "grisly bear," but it is not the name now applied to the valley by the Indians, who call it Ahwahnee or Auwoni.—See "The Yosemite Guide Book," by J. D. Whitney, state geologist (new ed., 1874).

YOUATT, William, an English veterinary surgeon, born in 1777, died in London, Jan. 9, 1847. He published "On Canine Madness" (London, 1830); "The Horse" (1831; enlarged ed. by E. N. Gabriel, 1859; enlarged ed. by Walker Watson, 1866); "Sheep" (1832); "Cattle" (1834); "Obligation and Extent of Humanity to Brutes" (1839); "The Dog" (1842); "The Pig" (1847); and "The Complete Grazier" (11th ed., 1864). In 1828 he established "The Veterinarian," the first periodical devoted to that class of subjects.

YOUMANS, Edward Livingston, an American scientific writer, born at Coeymans, N. Y., June 3, 1821. In his childhood his parents settled in Saratoga. At the age of 13 he was attacked with ophthalmia, resulting in blindness for several years, from which he recovered with very obscure vision and constant liability to the recurrence of the disease. He studied elementary chemistry and physics with the aid of his sister, who experimented and read for him, while he wrote with a machine of his own contrivance. In 1851 he issued a chemical chart illustrating composition by colored diagrams, which was revised and enlarged in 1856. In 1852 he published the "Class Book of Chemistry" (revised ed., 1863; translated into Spanish, 1866), which he rewrote in 1875, on the basis of recent chemical doctrines. In 1853 appeared "Alcohol and the Constitution of Man;" and in 1855 "The Chemical Atlas," with text. In 1857 he published "The Handbook of Household Science," and in 1864 "The Correlation and Conservation of Forces," a compilation with an introduction. In 1867 he printed "The Culture Demanded by Modern Life," a compilation with an introduction, and containing an original lecture on "The Scientific Study of Human Nature." He has pursued a course of medical study, and received the degree of M. D. from the university of Vermont, but has not practised. He has lectured extensively, and, in his courses on "The Chemistry of the Sunbeam" and "The Dynamics of Life," was the first to expound popularly the doctrines of the conservation of energy and the mutual relations of forces. In 1871 he planned the "International Scientific Series," and arranged for the publication of the works in New York, London, Paris, and Leipsic, the arrangement being subsequently extended to St. Petersburg and Milan. The project was based on the idea of payment to authors from the sale in all countries. Twenty volumes of the series have been issued (1876). In connection with this and similar undertakings he has made several visits to Europe. In 1872 he established the "Popular Science Monthly" in New York. Dr. Youmans has been instrumental in publishing the works of Herbert Spencer in this country, and he has also promoted the circulation here of the works of various foreign scientific writers, with the same remuneration to them that is allowed to American authors.—His sister, ELIZA ANNE YOUMANS, became interested in the scientific studies which she aided him to pursue, and her fondness for children led her to apply them to early education. In 1870 she published the "First Book of Botany, designed to cultivate the Observing Powers of Children," and in 1873 the "Second Book of Botany." These are intended to promote the systematic study of plants as objects, in place of the loose and incoherent "object lessons" in general use. She has also prepared an enlarged edition of Henslow's "Botanical Charts" (1873), translated from the French Quatrefages's "Natural History of Man" (1875), and contributed to the "Popular Science Monthly" and other periodicals.

YOUNG, a N. W. county of Texas, intersected by the Brazos river; area, 900 sq. m.; pop. in 1870, 135, of whom 4 were colored. The surface is undulating and diversified by prairie and woodland, and the soil is fertile. The chief productions in 1870 were 1,700 bushels of Indian corn. There were 88 horses, 14,236 cattle, and 740 swine. Capital, Graham.

YOUNG, Alexander, an American clergyman, born in Boston, Sept. 22, 1800, died there, March 16, 1854. He graduated at Harvard college in 1820, studied theology at Cambridge, and in 1825 was settled as pastor of the New South Congregational church in Boston. He published "Discourses on the Life and Character of John T. Kirkland" (Boston, 1838), and a similar work on Nathaniel Bowditch (1840; both afterward in 1 vol.); "Chronicles of the Pilgrim Fathers of the Colony of Plymouth" (1841); and "Chronicles of the First Planters of the Colony of Massachusetts Bay" (1846); and edited the "Library of Old English Prose Writers" (9 vols., 1831-'4).

YOUNG, Arthur, an English writer on agriculture, born at Bradfield, Suffolk, Sept. 7, 1741, died there, April 12, 1820. He abandoned mercantile business for literature, and began to write on agriculture as early as 1760. In 1768 he published "A Six Weeks' Tour through the Southern Counties," which at once became popular, on account of its shrewd observations and lively imaginative style. His "Course of Experimental Agriculture" (2 vols. 4to, London, 1770) contains "an exact register of the course of business transacted during five years on over 300 acres of various soils," which he had managed at Samford Hall, Essex. While thus engaged in farming, he was also a parliamentary reporter to the "Morning Post" of London, and spent only Saturdays and Sundays on his farm; and accordingly at the end of his five years he paid £100 to another to take his lease off his hands. His other works are: "Six Months' Tour through the North of England" (4 vols. 8vo, 1770); "The Farmer's Guide" (2 vols., 1770); "The Farmer's Tour through the East of England" (4 vols., 1771); "The Farmer's Calendar" (1771; 215th ed., rewritten by J. C. Merton, 1862); "Political Essays on the Present State of the British Empire" (1771); "Observations on the Present State of Waste Lands" (1771); "Rural Economy" (1772); "Political Arithmetic" (1774; translated into several languages); "Tour in Ireland" (2 vols., 1780); and "Travels in France, Spain, and Italy" (2 vols. 4to, 1791). He established the periodical "Annals of Agriculture" in 1784, and edited 45 volumes of it. George III. contributed to it under the name of Ralph Robinson. From 1779 Young was engaged in practical husbandry and its improvement, and from 1789 till his death he was secretary to the board of agriculture. His agricultural works were translated into French by order of the directory, under the title of *Le cultivateur anglais* (18 vols. 8vo, Paris, 1801–'2).

YOUNG, Brigham, ruler of the Mormons in Utah, born in Whitingham, Vt., June 1, 1801, died Aug. 29, 1877. He was a farmer's son, received little education, and became a painter and glazier. He was a member of the Baptist church, and is said to have preached occasionally. In 1832 he joined the Mormons at Kirtland, O., was ordained elder, became one of the twelve apostles, and was sent to the eastern states in 1835 to make proselytes, in which he was very successful. After the death of Joseph Smith, in June, 1844, Young was one of four aspirants to the presidency, and was unanimously chosen to that office by the apostles. The choice met the general approval of the sect, and soon afterward his principal rival, Sidney Rigdon, was excommunicated. After the charter of Nauvoo had been revoked and the city bombarded, Young set out with his followers in 1846, and after a weary march across the plains reached Great Salt Lake valley, which he persuaded them was the promised land. Here he founded Salt Lake City in July, 1847, became the absolute ruler of the colony, and in 1849 organized the state of Deseret, which applied for admission into the Union. This was denied by congress; but the territory of Utah was organized in 1850, of which Young was appointed governor for four years. In 1854, on the appointment of a governor who was not a Mormon, he began to disregard the laws and defy the authority of the federal government. In 1857 President Buchanan appointed Alfred Cumming governor of the territory, and sent him out with a military force of 2,500 men. This brought matters to a crisis, and the Mormons submitted and became peaceable. On Aug. 29, 1852, Young proclaimed the "celestial law of marriage," sanctioning polygamy, which he declared had been revealed to Joseph Smith in July, 1843. Smith's widow and her four sons at once denounced this as a forgery, and headed a schism. Though the Mormon apostles had repeatedly replied to the imputation of such doctrine or practice with the most emphatic and explicit denials, the personal power of Brigham Young was such that he had little difficulty in establishing polygamy as an institution of the church. He took to himself a large number of wives, most of whom resided in a building known as the "lion house," so called from a huge lion, carved in stone, which stood upon the portico. In 1874 his fifteenth wife left him, and petitioned the United States court for a divorce. In addition to his office of president of the church, Young was grand archee of the order of Danites, a secret organization within the church, which was one of the chief sources of his absolute power; and by organizing and directing the trade and industry of the community for his own advantage, he accumulated immense wealth.

YOUNG, Charles Augustus, an American astronomer, born in Hanover, N. H., Dec. 15, 1834. He graduated at Dartmouth college in 1853, from 1854 to 1856 taught the classics in Phillips Andover academy, and was professor of mathematics and natural philosophy in Western Reserve college, Hudson, Ohio, from 1856 to 1866. During these years his vacations were chiefly spent in astronomical work, determining latitudes and longitudes in the government surveys of the northern and northwestern lakes. In 1862 he was for a time a captain of Ohio volunteers. In 1865 he was appointed to the professorship of natural philosophy and astronomy in Dartmouth college, which had been held by his father, Ira Young, and by his grandfather, Ebenezer Adams. As a member of Prof. J. H. Coffin's party, he observed the total eclipse of the sun at Burlington, Iowa, in August, 1869, and discovered the bright line in the spectrum of the corona, thus demonstrating it to be a solar and not a lunar or terrestrial phenomenon. In December, 1870, as a member of Prof. Winlock's party, sent out by the United States coast survey, he observed the total solar eclipse at Jerez, Spain, confirmed the results of his observations of 1869, and discovered the reversal of the dark lines of the solar spectrum, by a gaseous layer close to the sun's photosphere. In July, 1872, he was sent by the government with a party of the coast survey, to determine the advantage of high altitudes for astronomical observations; in this expedition valuable results were obtained, especially in spectroscopy. From an elevation of nearly 8,300 ft. on the Rocky mountains he observed not fewer than 273 bright lines in the spectrum of the photosphere. In 1874 he accompanied Prof. J. C. Watson to Peking, China, as assistant astronomer to observe the transit of Venus. Prof. Young has published in the scientific journals numerous papers, chiefly on spectroscopy and solar physics. He is distinguished also as the only astronomer who has yet obtained a photographic record of a prominence when the sun has not been eclipsed, for his work in the classification of prominences, in the study of the connection between prominences, spots, and faculæ, and generally for the skill with which he has applied spectroscopic analysis to solar phenomena.

YOUNG, Edward, an English poet, born at Upham, near Winchester, in 1684, died April 12, 1765. He was educated at Winchester school and Oxford university, and received in 1708 a law fellowship at All Souls' college. In 1714 he took the degree of LL. B., and in 1719 that of D. C. L., but did not practise law. He first published a poem entitled "An Epistle to the Right Honorable the Lord Lansdowne" (1713), but became ashamed of its fulsome adulation and suppressed it. He next issued two long poems, "The Last Day" (1713) and "The Force of Religion" (1714), which were succeeded by a "Poem on the Death of Queen Anne" (1714). In 1719 he produced at Drury Lane his tragedy of "Busiris," and in 1721 "The Revenge," which is still occasionally performed. In 1725–'8 appeared his satires, under the general title of "The Love of Fame, the Universal Passion," which brought him £3,000 and higher repute. In 1727 he took orders, and became one of the king's chaplains; and thinking dramatic authorship incongruous with his clerical standing, he withdrew his new tragedy, "The Brothers," which was on the eve of being produced on the stage. In 1730 he received the rectory of Welwyn in Hertfordshire, and in 1731 married Lady Elizabeth Lee, daughter of the earl of Lichfield. The death of his wife in 1741, with several contemporaneous afflictions, gave rise to Young's most celebrated poetical work, the "Night Thoughts" (London, 1742–'6). From 1761 till his death he was clerk of the closet to the princess dowager of Wales. Collective editions of his works appeared in 1741 and 1757, and a revision in four volumes in 1762, to which two volumes were added after his death by Isaac Reed (1767).

YOUNG, Thomas, an English physicist, born of Quaker parents at Milverton, Somersetshire, June 13, 1773, died in London, May 10, 1829. He was able to read fluently at the age of two, learned surveying at eight, studied at school, besides the classical and modern languages, Hebrew, Persian, and Arabic, and in order to construct a microscope mastered the differential calculus. After seven years spent in private study, he studied medicine in London, Edinburgh, and Göttingen, and in February, 1797, returned to England. To qualify himself for membership in the college of physicians, he entered Emmanuel college, Cambridge, as a matter of form, and graduated in 1799. In 1801 he was appointed professor of natural philosophy at the royal institution; but he was not a popular lecturer, and in 1803 he resigned. In 1802 he published a "Syllabus of a Course of Lectures on Natural and Experimental Philosophy," containing the announcement of the discovery of the law of interference of light, which contributed largely to the establishment of the undulatory theory. (See LIGHT, vol. x., pp. 436 and 442.) In 1808 he became a fellow of the college of physicians, in 1810 was elected one of the physicians of St. George's hospital, and in 1818 was appointed secretary of the board of longitude, on the dissolution of which he became sole conductor of the "Nautical Almanac." From 1802 till his death he was foreign secretary of the royal society, and during the latter years of his life was a member of the advisory scientific committee of the admiralty. Dr. Young also engaged in the study of Egyptian hieroglyphics, and held several controversies with Champollion. His conclusions were published in the article "Egypt" in the supplement to the "Encyclopædia Britannica" in 1819, and show that he first determined that the wings on the Rosetta stone contain the name of Ptolemy, and that the characters are phonetic. His other works include "A Course of Lectures on Natural Philosophy and the Mechanical Arts" (2 vols. 4to, 1807; new ed. by Prof. Kelland, 2 vols. royal 8vo, 1845); "A System of Practical Nosology, with an Introduction to Medical Literature" (1813); "A Practical and Historical Treatise on Consumptive Diseases" (1815); "Elementary Illustrations of the Celestial Mechanics of Laplace" (1821); and "Rudiments of an Egyptian Dictionary" (1830). His miscellaneous works have been collected by Dean Peacock and John Leitch (4 vols. 8vo, London, 1855), by the former of whom his life was written (8vo, 1855).

YOUNG MEN'S CHRISTIAN ASSOCIATIONS. Organizations of Christian young men existed in Great Britain and Ireland more than 200 years ago, and extended into Germany and Switzerland; and in 1710 Cotton Mather addressed kindred societies in New England, under the title of "Young Men Associated." There were similar associations in some German cities between 1834 and 1842, and a larger movement in 1849, from which originated the German associations of the present day. The modern English-speaking associations began in a meeting of clerks in a London mercantile house in 1844, organized by George Williams, one of the clerks, which grew into the first young men's Christian association. It was soon imitated in different cities of Great Britain; and in December, 1851, an association after the London model was formed in Montreal, and shortly after one was formed in Boston. Associations multiplied rapidly throughout the United States, until their growth was retarded by the civil war of 1861–'5. In 1866 a new period of growth began, and there are now (1876) in the United States and Canada about

700 associations, with a membership of nearly 100,000. There are in Great Britain and Ireland about 300 associations, in Germany 200, in Holland 200, in France 40, in Switzerland 30, in Belgium 18, in Australia 5, in the Hawaiian Islands 1; and there is one organized among the foreign residents in Yokohama, Japan. The aggregate membership in America and Europe is about 250,000. In the United States and Canada 519 associations reported in 1875 an aggregate membership of 69,011; 337 reported their annual current expenses at $360,365; 198 own libraries containing 181,340 volumes; 56 own buildings valued at $2,434,900; and 46 have building funds, amounting to $408,756.—The associations in the United States and Canada are affiliated in an international convention which was organized in 1854, in state and provincial conventions recommended by the international convention in 1866, and in county and district conventions. The associations in France are connected with the *union générale de France.* Seven conferences of "associations of all lands" have been held in Europe, the latest being in Hamburg in 1875, when 135 delegates were present from 38 associations in seven nations. Active membership is limited, by the basis adopted by the world's conference in Paris in 1855, to "young men who, regarding Jesus Christ as their God and Saviour according to the Holy Scriptures, desire to be his disciples in their doctrine and in their life." In the United States and Canada the practical test is membership in some evangelical church, according to a rule adopted by the international convention at Portland in 1869, which allows representation in the convention only to associations organized upon this basis. Older church members are admitted, with restricted privileges, as counselling members, and young men of good moral character, though not church members, are admitted as associate members, with all the privileges of active membership, but with no controlling voice in the business of the society. Some associations admit young women to membership. The associations seek to be the agents of the churches of all denominations in behalf of young men. For these they maintain libraries, reading rooms, lectures, classes of secular instruction, gymnasiums, and social meetings, besides prayer meetings, Bible classes, and other religious meetings. Bible classes are held in almost all the associations in Canada, and in one fourth of those in the United States. That in New York had in 1875 an average attendance of 1,064. The associations also have committees to invite strangers to their rooms, to direct them to proper boarding houses, to secure work for those unemployed, and to visit the sick. They have brought out a great amount of lay activity, in work among soldiers and sailors, in prisons, and among railway employees, and have aided the sufferers from fire in Chicago, and from the yellow fever in southern cities. Associations have been organized among the students in 34 colleges. There are 23 German associations in the United States, which were united in a national *Bund* in 1874; and an association was formed among the Chinese residents of San Francisco in 1871, which now has 250 members. The American associations have secured stringent legislation against obscene literature; they maintain street preaching in many cities, and daily and Sunday religious meetings, and have organized a system of lay evangelism, of which the meetings held by D. L. Moody are the most prominent examples. The international convention appointed an executive committee of five, which in 1866 was fixed for three years in New York, where it has since been continued. In 1868 this committee sent out a visitor who organized the Pacific railroad mission along the line of that road, then building. In 1870 it sent visitors to the south, and it has repeated the southern visitation yearly; its visitation in 1874–'5 extended through eleven states, and was accompanied with religious revivals in many places, besides the organization or revival of many associations. A mission among the railroad men in Cleveland in 1872 was organized into a branch of the young men's Christian association; and similar organizations have been formed in other railroad centres. Twenty-six state and five provincial conventions have organized executive committees after the model of the international committee, with a system of regular visitation. The international committee, nine state committees, and one provincial committee employ salaried officers, and 70 local associations employ general secretaries who are wholly occupied in directing the general work. The English associations publish a monthly pamphlet in London, and there are 20 official publications in the United States and Canada.—In 1857 the ladies' Christian union of New York was formed, and in 1866 the young women's Christian association of Boston. These were followed by similar organizations, which have met in general conference in 1871, 1873, and 1875. There are now 47 women's Christian associations in the United States and Canada, with about 10,000 members. Of these, 16 own property valued at $1,000,000, 16 have libraries, 19 have boarding houses for young women, and 9 furnish temporary lodgings; 19 have industrial schools, 6 have classes in secular instruction, 17 assist in finding employment, 12 conduct Bible classes, and nearly all maintain regular prayer meetings. They also have under their care hospitals, schools, and asylums.

YOUNGSTOWN, a city and the county seat of Mahoning co., Ohio, on the Mahoning river, 135 m. N. E. of Columbus, 60 m. S. E. of Cleveland, and 60 m. N. N. W. of Pittsburgh, Pa.; pop. in 1860, 2,759; in 1870, 8,075; in 1876, locally estimated at 15,000. It has a street railroad, a new court house and jail which cost $150,000, an elegant opera house, several fine hotels, and many handsome residences. It is situated in a rich agricultural region, which abounds in coal and iron, and has an important trade. Railroad facilities are afforded by the Ashtabula, Youngstown, and Pittsburgh and the Painesville and Youngstown lines, the Mahoning division of the Atlantic and Great Western, and the Youngstown branch of the Lake Shore and Michigan Southern. Coal mining and iron manufacturing are the chief interests. There are seven rolling mills, eleven blast furnaces, two founderies, a nut and bolt factory, &c. The city contains two national banks, eight school houses, an endowed academy, a daily and four weekly (one German) newspapers, and 18 churches. It was settled about 1800, and was made the county seat in 1874.

YPRES (Flem. and Ger. *Ypern*), a city of Belgium, in the province of West Flanders, on the Yperte, 30 m. S. W. of Bruges; pop. in 1871, 16,317. The surrounding marshes have been drained, and the fortress has been razed. It has a Gothic town house, formerly a cloth hall (*les halles*), with a stately belfry tower, and 44 modern statues of counts of Flanders; many churches, including a fine Gothic cathedral, with the adjoining grave of Jansenius, who died here; and the national school of cavalry and several colleges. Of the manufactures, which employed thousands of looms in the 14th century, when the inhabitants numbered 200,000, those of woollens and linen (*diapre d' Ypres*), thread, and thread lace are still of some importance.

YPSILANTI, a city of Washtenaw co., Michigan, on the Huron river and on the Michigan Central and the Detroit, Hillsdale, and Southwestern railroads, 30 m. W. by S. of Detroit; pop. in 1860, 3,955; in 1870, 5,471; in 1874, 5,211. It is surrounded by a productive farming region, and has considerable trade. The river furnishes water power. There are several flouring mills, four large paper mills, a woollen mill, and several wagon and carriage factories. There are a national bank, a union school, several ward schools, a seminary, two weekly newspapers, and eight churches. The state normal school is situated here. Ypsilanti was incorporated in 1858.

YPSILANTI, or **Ypsilantis,** the name of a powerful and wealthy Fanariote Greek family, originating at Trebizond, and claiming descent from the Comneni. **I. Athanasius,** in the early part of the 18th century, was a favorite of the sultan at Constantinople. **II. Alexander,** his son (1725–1805), was interpreter at the Sublime Porte, became hospodar of Wallachia in 1774, granted religious freedom to Lutherans in 1780, resigned shortly after, was reappointed in 1790, was taken prisoner by the Russians and released after the peace of Jassy in 1792, was again hospodar in 1796–'8, was afterward suspected by the Porte of treasonable relations with Russia, and was executed with great tortures. **III. Constantine,** son of the preceding, born in Constantinople about 1760, died in Kiev in 1816. He conspired for the deliverance of Greece, but was detected and fled. His father having obtained his pardon, he returned and became dragoman to the Porte, and in 1799 was appointed hospodar of Moldavia, and shortly afterward of Wallachia. He was dismissed in 1805 on account of his relations with the Russians, entered the Russian service against Turkey, and after the peace of Tilsit lived at Kiev on a pension from the Russian government. **IV. Alexander,** son of the preceding, born in Constantinople in 1783, died in Vienna, Jan. 31, 1828. He entered the Russian service in 1809 as an officer in the cavalry of the guard, became major in 1812, and lost his right hand in the battle of Dresden, Aug. 27, 1813. He was made a colonel and adjutant of Alexander I., and in 1817 a major general. In 1820 he took the leadership of the movement projected by the Hetæria, the secret society formed to promote the independence of Greece. The outbreak began in the Danubian principalities in February, 1821; but he lacked the qualities of a commander and a revolutionist, and the fatal issue of the battle at Dragashan, June 19, put an end to the project for the time. Ypsilanti fled to Transylvania, and surrendered himself to the Austrians, who kept him a prisoner for six years at Munkács and Theresienstadt; and when released in 1827, through the interposition of the czar Nicholas, his health was destroyed. **V. Demetrius,** brother of the preceding, born in Constantinople, Dec. 25, 1793, died in Nauplia (Napoli di Romania), Greece, Aug. 16, 1832. He distinguished himself in the Russian service in 1814, joined the insurrection in the Morea in June, 1821, demanded that the supreme command should be given him, and on its refusal quarrelled with the party of Mavrocordatos. He took command at the siege of Tripolitza, which he carried by storm in October, but was repulsed in December at Nauplia. In July, 1822, he distinguished himself by audaciously holding the citadel of Argos and rendering possible the total destruction of the enemy in the passes between that place and Corinth. In 1823, failing to obtain political supremacy, he withdrew from public affairs. In June, 1825, he successfully opposed Ibrahim Pasha at the mills of Lerna, and in 1826 took a prominent part in advocating the rejection of the proposed English protectorate. When Capo d'Istria assumed the government in 1828, Ypsilanti was made commander of the troops in eastern Greece, but resigned in 1830. In April, 1832, after the assassination of Capo d'Istria, he was chosen one of the seven members of the executive commission, and held that office till his death.—The present chief of the family, Prince Gregory Ypsilanti, born in 1835, was for many years Greek minister to Austria, and for a long period at the same time to the court of Berlin. In May, 1876, he was transferred to Paris. In 1862 he married a daughter of Baron Sina, the famous Greek banker at Vienna, a portion of whose vast wealth she inherited on his death in April, 1876.

YRIARTE, Ignacio, a Spanish painter, born in the province of Guipúzcoa in 1620, died in Seville in 1685. He was the most celebrated of Spanish landscape painters, but did not excel in figures, which in several of his works were painted by Murillo.

YRIARTE. I. Juan de, a Spanish scholar, born at Orotava, in the island of Teneriffe, Dec. 15, 1702, died in Madrid, Aug. 23, 1771. He studied in Paris and London, revisited Teneriffe in 1724, and then went to Madrid and became a secretary in the royal printing office, a librarian in the royal library, and in 1740 official translator to the principal secretary of state. He was elected a member of the royal academy in 1743, and devised an improved system of orthography, punctuation, and accentuation for the Spanish language. He collected 24,000 Spanish proverbs, and published *Grammatica latina, en verso castellano* (Madrid, 1771; 8th ed., 1820) and other works in prose and verse (select edition, 2 vols. 4to, 1773). **II. Tomas de,** a Spanish author, nephew of the preceding, born at Orotava in 1750, died in Madrid in 1791. He received his education in Madrid under the auspices of his uncle, at the age of 18 produced some translations of French plays which were performed, and received a place in the office of the secretary of state, which he retained until the close of his life. His literary pursuits were much interrupted by personal controversies with rivals, and in 1786 he was summoned before the inquisition on suspicion of being tainted with the new French philosophy. His published works, apart from his controversial writings, comprise original and translated dramas, didactic poems, and fables. The best of his poems is *La música*, published in 1779, which has passed through several editions and been translated into the chief European languages. His reputation however rests upon his *Fábulas literarias*, nearly 80 in number, in upward of 40 different metres. The fictions are restricted in their moral purpose to the correction of the faults and follies of men of learning. They have been translated into English by George H. Devereux ("Literary Fables of Yriarte," 16mo, Boston, 1855) and others.

YTTRIUM (from Ytterby in Sweden, where the minerals containing it were first found), a rare metal, first obtained pure by Wöhler in 1828, the oxide of which, discovered by Gadolin in 1794, occurs in small quantity as a component of several minerals, such as gadolinite, yttrotantalite, yttro-titanite, yttro-cerite, &c. It is most conveniently obtained from its chloride by a method similar to that employed for aluminum. Its symbol is Y; atomic weight, 61·7. Metallic yttrium, as described by Berzelius, is a blackish gray powder, but this was undoubtedly a mixture of yttrium and erbium. In its impure state it is not oxidized in the air at red heat, nor by contact with steam; but in oxygen gas it burns brilliantly, yielding a white protoxide, or yttria. The oxide is best secured through a process employed to separate it from the mineral gadolinite; the carbonate is first formed, and being ignited, yttria remains. Yttria is a white powder, without odor or taste, soluble in the carbonates of the alkalies, especially that of ammonia; sp. gr. 4·842. When ignited it glows with a pure white light, and unlike erbia yields no bright bands in the spectrum. Upon precipitating its salts from an aqueous solution, it takes the form of a hydrate. With phosphorus, sulphur, iodine, &c., yttrium forms colorless and more or less crystalline salts. The chloride is obtained by passing chlorine over a mixture of yttria and charcoal, in a heated porcelain tube.

YUBA, a N. E. county of California, bounded S. by Bear river and W. by Feather river, and intersected by Yuba river, a tributary of the latter; area, 600 sq. m.; pop. in 1870, 10,851, of whom 2,337 were Chinese. The N. E. portion lies in the foot hills and lower slopes of the Sierra Nevada; the rest of the county is occupied by the extensive and fertile valleys of the streams. There is some mining. It is traversed by the Oregon division of the Central Pacific railroad and by the California Northern railroad. The chief productions in 1870 were 147,347 bushels of wheat, 33,245 of Indian corn, 27,867 of oats, 270,271 of barley, 9,256 of potatoes, 76,743 gallons of wine, 30,060 lbs. of hops, 63,425 of wool, 100,695 of butter, and 14,081 tons of hay. There were 3,194 horses, 2,909 milch cows, 5,794 other cattle, 12,540 sheep, and 13,947 swine. Capital, Marysville.

YUCATAN, a peninsula of Mexico, extending from about lat. 17° 20′ to 21° 30′ N., and from lon. 87° to 92° 30′ W. It is bounded W. and N. by the gulf of Mexico, E. by the Caribbean sea, S. E. by British Honduras, and S. by Guatemala and the state of Tabasco; area (inclusive of neighboring islands), 58,748 sq. m.; pop. in 1869, 502,731, a large proportion of whom are Indians, chiefly Mayas. The coast, generally higher and bolder on the Caribbean sea than elsewhere, is there indented with numerous bays, some forming excellent harbors. The remainder of the shore is low and sandy, and the northern portion presents two sandy peninsulas, on which are the ports (or rather roadsteads) of Sisal and Progreso. The principal inlet on the W. coast is that forming the Laguna de Términos. The chief islands are Cozumel, with an area of about 300 sq. m., Cármen or Perla del Golfo, lying across the mouth of the Laguna de Términos, and the Alacranes group. The face of the country is mostly low and flat, save in the interior of the E. portion, where a low chain of hills traverses the peninsula from N. E. to S. W. The only important stream is the Usumasinta, which, rising in Guatemala and forming part of the southern boundary of the peninsula, sends one of its branches to empty into the

Laguna de Términos. A most remarkable feature of Yucatan is the number and magnitude of its subterranean rivers. The climate, though generally very hot, is on the whole salubrious, except on the gulf coast, which is periodically visited by yellow fever. The seasons are but two, the dry from October to May, and the wet embracing the remaining months. Most of the interior is covered with dense forests, rich in many varieties of precious woods, including mahogany and rosewood. The soil in the south and east is of great fertility, yielding abundant crops of maize, pulse, rice, indigo, tobacco, coffee, vanilla, sugar cane, and, above all, the precious *henequen* or pita plant, which furnishes Sisal hemp. Copal and other resins and gums are plentiful. The chief occupations are agriculture and cattle rearing, the manufacture of coarse cotton fabrics and of various articles of henequen, and fishing. The evidences of a higher civilization possessed by the race who originally inhabited Yucatan are abundant and interesting. The ruins of Uxmal, Chichen, Izamal, Mayapan, &c., have been explored by Stephens and other archæologists. Those of Uxmal, the most remarkable, are situated about 50 m. S. S. W. of Mérida. They comprise numerous massive limestone structures built on broad terraced platforms, and all highly ornamented. The largest single building, called the "governor's house," has a front of 322 ft., and contains 24 rooms. The most beautiful structure is the "house of the nuns," composed of four ranges enclosing a large courtyard, with 88 apartments. The "house of the dwarf," on a very steep mound 88 ft. high, was a *teocalli* for human sacrifices. But little, if anything definite, is known of the uses of the temples and other vast edifices, which, from their size and profuse ornamentation in carved and colored figures and bassi rilievi, are even in their ruined state among the most wonderful architectural relics in the western world. Nor does any certainty exist relative to the building of the edifices and cities, though Morelet, Orozco y Berra, and some others contend that they could only have been constructed by the Toltecs. (See Chichen.)—Juan Diaz de Solis and Vicente Yañez Pinzon are said to have discovered the E. coast of Yucatan in 1506; but the first European who visited its shores was Francisco Fernandez de Cordova, in 1517. The conquest of the country, carried on successively by Cordova, Juan de Grijalva, and Francisco de Montejo, was completed by the son of the last named in 1541; and Yucatan, at first named New Spain (a name afterward applied to the whole territory which still later was called Mexico), belonged to Spain till 1821. After more than three years of independence, it was united to Mexico in 1824; it was again independent from 1840 to 1843, and from 1846 to 1852; and it has since belonged to Mexico, first as a single state till 1858, and afterward as two states, Yucatan and Campeachy.

YUCATAN, a maritime state of Mexico, occupying the N. E. portion of the peninsula of Yucatan; area, 32,658 sq. m.; pop. in 1869, 422,365, mostly Maya Indians. The state is divided into 15 districts, viz.: Mérida, Motul, Izamal, Valladolid, Espita, Tizimin, Ticul, Sotuta, Tekax, Peto, Maxcanú, Temax, Tixkokob, Hanucmá, and Acanceh. The capital is Mérida. Public instruction is here in a flourishing condition, there being a literary institute, private colleges, academies, and lyceums, schools of law, medicine, and pharmacy, and in 1869 154 primary schools, with an attendance of 7,493, of whom 1,388 were females. Since that time it is estimated that the attendance at the primary schools has increased by 25 per cent. The manufactures are very prosperous, comprising cotton fabrics, cigars and cigarettes, rum, refined sugar, molasses, cordage and other articles from the pita plant or *henequen*, leather, soap, Panama hats, &c. The chief articles of export are Sisal hemp, cordage, leather, deer skins, salt, Panama hats, cattle, hides, and indigo. The mean annual value of the foreign commerce, almost exclusively carried on through Progreso, the port of Mérida, on the gulf of Mexico, is about $2,000,000; rather more than two thirds being with the United States, one fourth with Havana, and the remainder with France and England. The port of Progreso is visited twice monthly by the steamers of the New York and Vera Cruz line; and the total annual tonnage, including sailing vessels, is about 60,000. A railway from Mérida to Valladolid is in course of construction (1876), and there are in the state about 500 m. of telegraph wires.

YUKON RIVER. See Alaska, vol. i., p. 240.

YULE, Henry, an English author, born about 1810. He joined the army in India, became colonel of the royal engineers, Bengal, and now lives in London. His works include "Fortification" (1851); "Narrative of the Mission sent by the Governor General of India to the Court of Ava," to which he had been attached (4to, 1858); "Cathay, and the Way thither," a collection of mediæval notices of China, translated and edited with an essay (Hakluyt society, 2 vols., London, 1866); "The Book of Ser Marco Polo, the Venetian, concerning the Kingdoms and Marvels of the East," newly translated (2 vols., London, 1871; 2d ed., revised, enlarged, and illustrated, 1875); "Papers connected with the Upper Oxus Regions" ("Journal of the Royal Geographical Society," 1872); annotations included in E. D. Morgan's translation of Preyevalski's "Mongolia, the Tangut Country, and the Solitudes of Northern Thibet" (2 vols., 1876); and an introductory essay on central Asia appended to Wood's "Journey to the Oxus" (1876).

YUMA, the S. W. county of Arizona, bounded S. by Mexico, separated from California and Lower California on the west by the Colorado river, and intersected by the Gila; area, about 10,000 sq. m.; pop. in 1870, 1,621. The valley of the Colorado is from 2 to 10 m. wide; that of the Gila from 1 to 3 m. These valleys, with irrigation, are very productive. The rest of the county consists mostly of high table lands, with frequent broken mountains, and is generally destitute of water. A part of the year these table lands are covered with grass. The climate in summer is very hot and dry; in winter it is mild and healthful. Gold, silver, copper, and lead are found in lodes near the Colorado, and there are extensive deposits of copper along the S. border. Capital, Yuma.

YUMAS, a nation of American Indians on both sides of the Colorado near its junction with the Gila, calling themselves the Sons of the River. They are also termed Cuchans. They were early known to the Spaniards, and were visited by Father Kühn in 1701, and by Sedelmayr in 1744 and 1748. In 1780 Spanish settlements were begun among them with two Franciscan missions, Purisima Concepcion and San Pedro y San Paulo; but as the Spaniards occupied nearly all their fertile lands, the Yumas in July, 1781, massacred all the whites. In 1791 their number was estimated at 3,000. After their territory came within the limits of the United States they were visited by Lieut. Whipple in October, 1849. They were then friendly to whites, inhabited rude excavated huts, with roofs of boughs supported by posts, and lived partly by hunting and fishing and partly on maize, melons, and pumpkins raised by the women, and on mezquite beans and grass seed gathered by them. The women made water-tight baskets and rude pottery, and a kind of brandy from the mezquite. They had horses and dogs, but no other animals. Round bits of shell pierced as beads served for money and ornament. The men wore a breech cloth, the women a bark fringe apron; all painted. The hair was cut at the eyebrows, but worn very long behind. They were well formed, active, and intelligent. They have been faithful, refusing to join other tribes against the Americans, except in 1853, when under Antonio Gana they rose against the whites, but were defeated by Gen. Heintzelman. Since Fort Yuma was placed near them the women have been completely debauched, so that the whole tribe is now diseased. They have long been at war with the Maricopas, Pimas, and Papagos. In 1828 they were nearly annihilated by their enemies, and the remnant of the nation fled to the Mohaves, where they remained till 1845, when they returned to their original hunting grounds. They renewed war with the Maricopas in 1849, but in 1857 they and their allies were defeated at Maricopa Wells, and out of 100 Yuma braves only 6 escaped. Under the act of March 3, 1865, and executive orders of Nov. 22, 1873, and Nov. 16, 1874, a reservation of 200 sq. m. was set apart for the Mohaves, Cocopas, Hualapais, Yumas, and Chemehueves; but though the influx of whites has narrowed their tillable lands and hunting grounds, and the mezquite is used for fodder, they shrink from going on the reservation, and live chiefly by menial labor. They are now (1876) reduced to 930. The Mohaves, Cocopas, Yavapai, and San Diego Indians are allied in language to the Yumas, and Pimentel traces a connection between the Yuma and Pima tongues.

YUNNAN, a S. W. province of China, bounded N. W. by Thibet, N. by Szechuen, E. by Kweichow and Kwangsi, S. by Anam, Laos, and Siam, and S. W. by Burmah; area, 107,969 sq. m.; pop. according to the census of 1812, 5,561,320, and estimated in 1876 at about 6,000,000. The lakes of Yunnan are celebrated, and the Talifu, in the northwest, is over 100 m. long by 20 m. broad. The main rivers are the Yangtse in the north and the Lantsan running S. into the gulf of Siam. The Tonquin affords easy access to S. Yunnan. The country is mountainous and has little tillage. A portion of the people are Mohammedans, and civil conflicts have arisen, whence industry and agriculture have greatly declined. There are very valuable mines, but they are not worked. The capital, of the same name, on the N. shore of Lake Chin, is an important manufacturing and trading place.—For the Mohammedan rebellion in Yunnan and the extinction of the empire of the Panthays, see CHINA, vol. iv., p. 464. In 1868 an expedition was sent from British India to explore the route through Burmah to Yunnan, with a view to promoting trade. In 1875 a second expedition set out to complete the work, which was joined at Bhamo by Mr. Margary, who had been sent from Shanghai and passed through Yunnan. They met with hostility in their progress, and Mr. Margary, entering Manwyne alone, was murdered. The expedition returned, and a new one was sent in 1876, which secured reparation for the murder.—See "Mandalay to Momien: a Narrative of the two Expeditions to Western China of 1868 and 1875, under Col. Edward B. Sladen and Col. Horace Browne," by John Anderson, M. D. (London, 1876).

YVERDUN, or **Yverdon** (anc. *Ebrodunum;* Ger. *Ifferten*), a town of Switzerland, in the canton of Vaud, beautifully situated at the S. W. end of Lake Neufchâtel, at the mouth of the Thiele, 17 m. N. of Lausanne; pop. in 1870, 5,889. It has fine promenades, a gymnasium, a school for deaf mutes, and a library with Roman antiquities. The palace, built in 1135 by Duke Conrad of Zähringen, and enlarged in 1260 by Peter of Savoy, was occupied by Pestalozzi for his institute from 1805 to 1825. Felice founded here a great printing and publishing establishment, issuing among other works an *Encyclopédie* in 48 vols. 4to. (See FELICE, FORTUNATO BARTOLOMMEO.)—The place was a fortified town under the Romans, and was much more important in the middle ages than now.

YVON, Adolphe, a French painter, born at Eschweiler, Lorraine, in 1817. He studied under Paul Delaroche, and became known by portraits and genre and historical pictures. He went to Russia in 1843, and made a series of designs exhibited in 1847 and 1848. His works include "Mme. Ancelot" (1842); "Remorse of Judas" (1846); "A Fallen Angel" (1852); "The First Consul descending the Alps" (1853); "Ney supporting the Rear Guard in Russia" and "The Seven Capital Sins," after Dante (1855); "Capture of the Malakhoff" (1857), which, executed in the Crimea for the government, became very popular, and reappeared at the exhibition of 1867 with other pieces relating to the Malakhoff; "The Battle of Solferino" (1861); and "Magenta" (1863).

Z

Z, THE last letter of the Teutonic, Romanic, and most of the Slavic alphabets, the sixth of the Greek, and the seventh of the Hebrew, Phœnician, and Arabic. In English, French, and Portuguese, as well as in modern Greek, Polish, Bohemian, and Hungarian, it is simply a linguo-dental consonant, forming the feeble or sonorous counterpart of the sibilant S, the difference between the two resulting from the fact that in sounding Z the vocal chords of the glottis are used, while in sounding S they are inactive. In all these languages the regular sound of Z is that heard in the words *zone*, *zebra*, *zinc*. In the ancient Greek it had the sound of English *dz*, and was reckoned metrically as a double consonant. It was introduced into the Latin in the time of Augustus, and placed at the end of the alphabet. In German it is pronounced as *ts;* in Italian as *ts* and *dz;* in Spanish like *th* in *think*, but in Spanish America generally like *s* sharp. The Russians have two letters, one the eighth of their alphabet, representing our simple Z, the other the 23d, equivalent to *ts*.—As a numeral the Greek Z signifies 7; among the Romans Z stood for 2,000; with a horizontal line over it, for 2,000,000.

ZACAPA, a town of Guatemala, in the department of Chiquimula, about 60 m. E. N. E. of New Guatemala, and 30 m. S. W. of the Atlantic port of Izabal; pop. about 8,000. It is situated in the centre of a plain, on the right bank of the Rio Copan, 5 m. S. of its mouth in the Motagua, and 10 m. N. of the town of Chiquimula, the capital of the department. Coffee is extensively cultivated in the vicinity.

ZACATECAS. I. An inland state of Mexico, bounded N. by Coahuila, E. by San Luis Potosí, Aguas Calientes, and Jalisco, S. by Jalisco, and W. by Jalisco and Durango; area, 26,585 sq. m.; pop. in 1871, 397,945. It is one of the most mountainous states in the republic, being traversed from N. to S. by a branch of the Sierra Madre, with numerous spurs on the west. East of this there are comparatively few mountains, and these for the most part form small isolated sierras. The hilly country of the centre and west is interspersed with spacious and fertile valleys, and deep ravines and gorges. Zacatecas is poorly watered, none of its few streams exceeding the proportions of mountain torrents. The climate, rather cold in the elevated region, is warm in the valleys, and is regarded as generally salubrious. Silver is extremely abundant in this state, which long ranked as the first, but now ranks as second to Guanajuato, among the great mining states of Mexico. Mining is the chief industry, though agriculture is extensively carried on, the cultivated products being the same as in Guanajuato. Zacatecas is divided into 12 *partidos* or districts, viz.: Zacatecas, Fresnillo, Sombrerete, Nieves, Mazapil, Ciudad García, Pinos, Villanueva, Sanchez Roman, Juchipila, Nochistlan, and Ojo Caliente. **II.** A city, capital of the state, in a deep mountain gorge, about 300 m. N. W. of Mexico; pop. about 35,000. Owing to its wild arid surroundings, it presents an aspect at once dull and bleak. The streets are very uneven and badly paved. It has several churches, a theatre, a hospital, a mint, primary schools, and a literary institute founded in 1868. The value of the coinage from 1810 to 1867 was $216,000,000.

ZACH, Franz, baron, a German astronomer, born in Presburg in June, 1754, died in Paris, Sept. 2, 1832. He served in the Austrian army, was director of the observatory at Seeberg near Gotha from 1787 to 1806, accompanied the widowed duchess of Saxe-Gotha in a journey in France in 1804–'5, removed to the south of France in 1812, and went with the duchess to Italy in 1813, settling at Genoa, where they remained till her death in 1827, when he returned to France. His *Geographische Ephemeriden* and *Monatliche Correspondenz* (28 vols., Gotha, 1800–'13) he continued while in Italy under the title of *Correspondance astronomique* (1818–'28). He also wrote on the attraction of mountains, and published several series of astronomical tables. He promoted the establishment of observatories at Naples and Lucca.—His elder brother, Baron ANTON (1747–1826), was an Austrian general, reaching the rank of field marshal lieutenant in 1801. He published works on fortification and on tactics, and papers on mathematics and astronomy.

ZACYNTHUS. See ZANTE.

ZAFFRE. See COBALT, vol. iv., p. 767.

ZAGAZIG, a town of Lower Egypt, capital of the province of Sharkieh, about 75 m. N. W. of Suez, with which it is connected by rail; pop. estimated in 1876 at 40,000, including many English and other foreign merchants. The cotton from the E. part of the delta of the

Nile is mostly cleaned and sorted here. The commercial importance of the town has greatly increased since the construction of the freshwater canal, which connects it with Ismailia and Suez. Near it are the ruins of the ancient city of Bubastis. (See BUBASTIS.)

ZAGOSKIN, Mikhail, a Russian author, born in the government of Penza in 1789, died in Moscow in July, 1852. He served in the campaign of 1812, was afterward connected with the imperial library at St. Petersburg, in 1820 became director of the theatre at Moscow, and in 1842 was made keeper of the armory in the Kremlin. He wrote 17 comedies, of which the most important are: "Mr. Boganotoff, or the Country Gentleman in the Metropolis;" "Boganotoff the Second, or the Metropolitan in the Country;" "A Romance on the High Road;" and "The Journey Abroad." His novel *Yuri Miloslavski* (3 vols., Moscow, 1829) gave him a high reputation. It was translated into English as "The Young Muscovite, or the Poles in Russia" (London, 1834). None of his many later novels attained such success. He published three or four volumes of essays under the title *Moskva i Moskvitchi.*

ZAGROS, the ancient name of a range of mountains which separated Media from Assyria. (See PERSIA, vol. xiii., p. 315.)

ZAHN, Johann Karl Wilhelm, a German architect and painter, born at Rodenburg, Aug. 21, 1800, died in Berlin, Aug. 22, 1871. He was educated in Cassel, and spent many years in Italy before and after his appointment in 1829 as professor in the Berlin academy of fine arts. His works include *Die schönsten Ornamente und merkwürdigsten Gemälde aus Pompeji, Herculanum und Stabiä* (Berlin, 1828–'30; 2d series, 1841–'5; 3d series, 1859–'63; each with 100 prints, in 10 parts), and *Ornamente aller classischen Kunstepochen* (20 parts with 100 colored prints, Berlin, 1832–'9; 3d ed., 1869–'71).

ZAIRE. See CONGO.

ZALA, a S. W. county of Hungary, bordering on Croatia, from which it is separated by the Drave, and on Styria; area, 1,890 sq. m.; pop. in 1870, 333,237, chiefly Magyars. It is mountainous or hilly, and about three fifths covered with woods. Excellent wine is obtained on the island of the Mur and on Lake Balaton. Agriculture, fishing, and the raising of bees and swine are the chief occupations. Capital, Zala-Egerszeg.

ZALEUCUS, the lawgiver of Locri Epizephyrii (Western Locri), a Greek colony in southern Italy. Nothing trustworthy has been recorded of his life, and some authorities doubt that he ever existed. The nature of his laws is also unknown. Tradition places him at about 660 B. C., and speaks of him also as a pupil or slave of Pythagoras, who lived about a century later. Those who accept the former date regard his laws as the first written code possessed by the Greeks. They are said to have been of extraordinary rigor. Whoever proposed a new law was obliged to appear in public with a rope around his neck, and if his proposition was not accepted he was immediately strangled.

ZAMA, an ancient town of Numidia, on the border of the Carthaginian territory. Here took place on Oct. 19, 202 B. C., the defeat of Hannibal by Scipio which terminated the second Punic war. (See HANNIBAL.)

ZAMACOIS, Eduardo, a Spanish painter, born in Bilbao about 1837, died in Madrid in January, 1871. He studied at the Madrid academy, in Italy, and in Paris under Meissonier, and excelled in genre pictures, such as "The Hunchback," "Diderot and D'Alembert," "Cervantes as a Recruit," "Spanish Recruits," "The Bull Fighters riding into the Arena," "Indirect Taxes," "A Court Jester of the 16th Century," and "The King's Favorite." Several of his pictures are in the United States.

ZAMBESI, a river of South Africa, known in its upper portions as the Leambye or Leeba. It rises in about lat. 11° S., lon. 23° E., flows S. about 700 m. to the great cataract of Mosioatunya or Victoria falls, then turns E., making a wide bend to the north and afterward to the south, and discharges by several mouths into the Indian ocean in about lat. 18° 45′ S., lon. 36° 40′ E. Its entire length is about 1,800 m. The Quilimane, formerly supposed to be the main mouth of the Zambesi, is a separate river, although the waters of the two interlock in the flood season. Above the falls the Zambesi flows sluggishly through a level country, often attaining a width of more than a mile. Below them for nearly 100 m. it is said to flow through a deep narrow ravine, but this portion is entirely unexplored. Reaching the flat region, it expands to the width of a mile or more, with sufficient depth at all seasons to be navigable by small vessels. Its mouths are obstructed by shifting sand bars. It receives several large affluents, among them the Shiré, which has been explored by Livingstone; it rises in Lake Nyassa, and after a course of 300 m. falls into the Zambesi 90 m. from its mouth. The Victoria falls, in lat. 17° 55′, lon. 26° 32′, were first seen by Livingstone in 1855, and again in 1860, and they have since been visited by about 20 Europeans. The river here falls into a chasm 400 ft. deep, bounded by perpendicular walls of basalt. The outlet, beginning near the E. end of the chasm, is only 270 ft. wide at top with the same depth, and makes short zigzags directly E. and W., nearly parallel with the falls, as far as it has been explored. Between these are narrow ledges or promontories of rock, sometimes barely wide enough for the passage of a single person. There are three falls separated by islands, the first or western 100 ft. wide, and the other two about half a mile each. After a descent of a few feet the water breaks into a white mass like a sheet of driven snow, and sends up columns of vapor reaching a height of 800 ft. above the brink of the falls. At the entrance of the outlet is a whirlpool, above which are several concentric rainbows.

The falls cannot be reached from the coast without a journey of at least three months, with a like period for the return, during which a party must carry their supplies with them.—See Livingstone, "Expedition to the Zambesi" (1866); Baines, "Travels in Southwestern Africa" (London, 1864), and "The Victoria Falls, Zambesi River, sketched on the spot" (1866); and "To the Victoria Falls of the Zambesi," by Ed. Mohr (London, 1876).

ZAMOJSKI, or Zamoyski. **I. Jan,** a Polish statesman, born at Skoków, in the palatinate of Chelm, in 1541, died at Zamosc in 1605. He was educated at Paris, Strasburg, and Padua, and after his return to Poland in 1565 soon rose to high positions. On the death of King Sigismund Augustus in 1572, he succeeded in extending the elective franchise of the equestrian order, in consequence of which Henry of Anjou (afterward Henry III. of France) was chosen king of Poland. The new king made him grand chamberlain. Upon the abandonment of Poland by Henry, a party of nobles elected Maximilian II. of Austria, but Zamojski placed himself at the head of the movement which gave the crown to Stephen Báthori of Transylvania, who made him grand chancellor of the kingdom, and in 1580, during the war with Russia, commander-in-chief of the army, with the title of hetman. In 1582 he brought about the favorable peace with Russia; but the enmity which his favor with the king, whose niece he married, had excited, and his unpopularity for the share he had in the reforms of Báthori and in the execution of a nobleman, Samuel Zborowski, led him to retire to a great extent from public life. After the death of Báthori in 1586, he might have secured the crown for himself; but he used his influence in favor of Sigismund III., the son of the king of Sweden, defeated the army of the opposing candidate, the archduke Maximilian, at Cracow, pursued him into Silesia, and took him and his forces prisoners. From 1590 till near the close of his life he almost alone maintained the integrity of the state, fighting successfully against Turks, Tartars, Cossacks, Moldavians, and Swedes, and oftentimes supporting the army from his private fortune. Increasing infirmities finally compelled him to retire to his estates, where he devoted himself to literary pursuits. He founded Zamosc, which became one of the strongest fortresses of Poland, established there an academy and a printing press, and munificently promoted letters and science. His writings include *Testamentum Joannis Zamori* (Mentz, 1606). **II. Andrzej,** count, a statesman, born in 1716, died in Zamosc, Feb. 10, 1792. He entered the military service of Saxony, but returned to Poland in 1754 with the rank of major general. In 1760 he emancipated his serfs, a measure which met with much opposition from the nobility. On the accession of Stanislas Augustus he was appointed grand chancellor; but when, in 1767, the Russian general Repnin had several senators and bishops transported to Kaluga, he resigned his office. In 1776, at the request of the diet, he drew up a code of laws, published under the title of *Zbiór praw sądowych* (3 vols., Warsaw, 1778). The liberal character of the code, especially its provision for a general measure of emancipation, aroused against it so great a hostility, that it was not adopted till 1791.

ZAMORA. **I.** A N. W. province of Spain, formerly part of the kingdom of Leon, bordering on the provinces of Orense, Leon, Valladolid, and Salamanca, and on Portugal; area, 4,135 sq. m.; pop. in 1870, 250,968. The surface is generally level, and the climate temperate and healthful. The principal rivers are the Douro, which intersects it, and its tributary the Esla. Grain, wine, and fruits are abundantly raised, and there are mines of antimony and argentiferous lead. Manufactures are backward. **II.** A city, capital of the province, on the right bank of the Douro, 133 m. N. W. of Madrid; pop. about 12,000. It is the seat of a bishop, has a theological seminary, a Gothic cathedral containing the grave of St. Ildefonso, 22 churches, 16 convents, and three hospitals. Serges, hats, leather, distilled liquors, flour, &c., are manufactured, and there is a considerable trade in wine and grain.—Zamora was recovered from the Moors in 748 by Alfonso the Catholic, and in 985 was retaken and destroyed by Almanzor. It was rebuilt under Ferdinand II. and Alfonso VIII., and was at times the capital of the kingdom of Leon and Castile. It was sacked by the French in 1808.

ZAMORA, Antonio de, a Spanish dramatist, born in the latter half of the 17th century, died after 1730. He was a chamberlain of King Philip V. His plays have been collected in two volumes, the best being *Mazariegos y Monsalves*, *El hechizado por fuerza*, and his *Don Juan* after Tirso de Molina's *El burlador de Sevilla, ó el convidado de piedra*, which furnished the groundwork of the modern treatment of the subject.

ZAMPIERI. See DOMENICHINO.

ZANCLE. See MESSINA.

ZANESVILLE, a city and the county seat of Muskingum co., Ohio, on both sides of the Muskingum river, at the mouth of Licking river, 78 m. above the junction of the former with the Ohio, and 59 m. E. of Columbus; pop. in 1850, 7,929; in 1860, 9,229; in 1870, 10,011; in 1873, 16,536; in 1876, locally estimated at more than 21,000. The Muskingum is here crossed by an iron railroad bridge 538 ft. long, and three other bridges. The city is well built, with wide regular streets, lighted with gas, and has water works costing more than $500,000, street railroads, a paid fire department, and a stone court house costing $300,000. The water is pumped from the river into reservoirs at an elevation of 194 ft., whence it is distributed through 30 m. of mains. Railroad communication is furnished by the Baltimore and Ohio (Central Ohio division) and the Cincinnati and Muskingum Valley lines. The Muskingum river is navigable by steamers to Dresden, 17 m. above the city, whence the Ohio canal affords means of transportation. The surrounding country is fertile, and is the source of a profitable trade. The chief interest is manufacturing, for which facilities are afforded by the water power in the rivers and the bituminous coal, iron ore, limestone, and clays of the adjacent country. There are two blast furnaces (one not in operation), a rolling mill, three large machine shops (producing stationary and portable engines, largely shipped to foreign countries), four founderies for castings and hollow ware, a manufactory of agricultural implements, four glass factories (one of window glass and three of bottles and hollow ware), two paper mills (one producing printing paper and the other printing and straw wrapping paper), a manufactory of burial cases, two of tile (one for roofing and the other, the only one of the kind in the United States, for flooring), six potteries, three soap factories, two tanneries, three sash and blind factories, a brass foundery, a wagon factory, two carriage factories, machine shops of the Baltimore and Ohio railroad, four large flouring mills, two woollen mills, and a cotton mill. The city contains a national bank and three private banks, with an aggregate capital of nearly $500,000. There are a high school and 18 ward school buildings, with 64 graded schools and one German school. John McIntyre, the founder of the city, left at his death an estate now valued at more than $300,000 for the benefit of free schools. The principal schools not under the control of the city are the Putnam female seminary, with a library of 2,500 volumes, and two Roman Catholic schools. A daily and five weekly newspapers are published. The Zanesville Athenæum has a reading room and a library of 5,500 volumes. There are 22 churches, viz.: 4 Baptist, 1 Episcopal, 2 Jewish, 2 Lutheran, 1 Methodist, 5 Methodist Episcopal, 4 Presbyterian, 2 Roman Catholic, and 1 United Brethren in Christ.—Zanesville was settled in 1799, and from 1810 to 1812 was the capital of the state.

ZANGUEBAR. See ZANZIBAR.

ZANTE, or **Zacynthus.** **I.** A nomarchy of the kingdom of Greece, comprising the Ionian island of the same name and several smaller islands; area, 277 sq. m.; pop. in 1870, 44,557. The island of Zante, 15 m. W. of the Morea and 10 m. S. of Cephalonia, is about 23 m. long and 12 m. broad, and is the third in extent but the first in productiveness of the Ionian isles. It consists mainly of a plain covered with vineyards of the small grapes which when dried are known in commerce as "Zante currants," of which 11,000,000 lbs. were exported in 1873. The production of olive oil in the same year amounted to 2,500 tons. Some good wine is made. The manufactures consist of white and blue cottonades, silk stuffs, handkerchiefs and scarfs, horsehair cloths, soap, bricks, tiles, &c. The name of the island is said to be derived from the founder of the chief city, Zacynthus, an Arcadian chieftain. Thucydides relates that at a later period Zacynthus received a colony of Achæans from the Peloponnesus. It was generally an ally of Athens until after the Peloponnesian war, when it seems to have fallen under the dominion of Sparta. It subsequently fell under the sway of Macedon, was occupied by the Romans during the second Punic war, and afterward shared the fate of the neighboring islands. (See IONIAN ISLANDS.) **II.** A city, capital of the nomarchy, on the S. E. coast of the island; pop. in 1870, 17,516. It is the seat of a Greek archbishop and a Roman Catholic bishop, and has five churches, a theatre, an arsenal, and a citadel. The harbor is large, and the best in the group except that of Corfu. In a marsh about 12 m. S. are petroleum wells, known since the time of Herodotus. The chief exports are currants and olive oil. Exclusive of Austrian and Greek steamers, the arrivals of vessels in 1873 numbered 473, and the departures 457; total tonnage, 75,223.

ZANZIBAR, a country on the E. coast of Africa, comprising the islands of Zanzibar, Pemba, and Mafia, and other smaller islands, and the coast opposite to them from the island of Warsheikh, lat. 2° 30′ N., to the village of Kionga, S. of Cape Delgado, in lat. 10° 45′ S. The word Zanzibar is a modification of Zanguebar or Zinguebar, the name given by Portuguese traders to that part of the mainland of Africa between the river Juba and Cape Delgado, which is inhabited by the indigenous negro race. It is derived from *Zing*, the old Arabic name of the E. African negroes, and *bar*, the Persian or Indian word for country. The name is now obsolete among the natives, and the coasts of the mainland are called simply *Es-sawahil*, the coasts; but it is still used by Europeans to designate the entire territory ruled by the seyid or sultan of Zanzibar, as well as the island on which is his seat of government. The mainland has been but little explored back of the coast, as the seyid's authority is scarcely recognized beyond the walled towns garrisoned by his troops. The country N. of the Juba is occupied mostly by the Somauli or Eesah tribes, and S. of it by the Gallas and other smaller tribes. The principal rivers are the Juba, which, though closed by a bar, is navigable for small craft, the Dana, the Sabaki, the Rufu, the Wami and Kingani opposite the island of Zanzibar, both of which are navigable, the Lufiji or Rufiji, and the Rovuma. The Lufiji is probably the most important, as it has a depth of five or six feet and a width of 250 yards, 30 m. from its mouth, in the dry season. The country watered by these rivers is very fertile, and supplies all kinds of tropical productions, including sugar, cotton, coffee, cocoa, cloves, nutmegs, cinnamon, Guinea pepper, sesame, and indigo, besides maize, millet, and rice. The forests furnish valuable timber and great quantities of caoutchouc and copal, and much fossil copal is dug in the country S. of the island of Zanzibar. All kinds of tropical fruits and vegetables abound. The elephant, rhinoceros, lion, leopard, hippopotamus, several kinds of antelopes, and the crocodile are found, and the rivers are well stocked with fish. Cattle, sheep, goats, and fowls are abundant. The principal towns on the coast held by the seyid are Makdishu, Marka, and Barawa, in the Somauli country, and Kismayu, Malindi, Mombas, Pangani, Bagamoyo, Kondutchi, Kilwa or Quiloa, and Lindi, on the Galla coast and the region S. of it. Of the larger islands, Pemba has an area of 227 sq. m., and Mafia of 200 sq. m. The greater part of the trade of Zanzibar is in the hands of the banians or Hindoo traders, who collect the African produce for the European and American export houses, and distribute the imported goods to the natives. They reside mostly in the coast towns, the interior commerce being carried on by Arabs, who make journeys of great length, sometimes as far as Angola on the W. coast. The amount of trade can scarcely be estimated, as the custom-house returns are not to be depended upon; but according to Dr. Kirk, the Indian capital invested in Zanzibar island alone is more than £1,600,000. In 1872 the exports from that island were estimated at about $2,500,000, and the imports at nearly the same amount; the exports of ivory amounted to $770,000, of gum copal to $284,000, and of cloves to $267,000. The other principal exports are hides, goat skins, archil weed, surisuri seed, ebony, cocoanut oil, and gum myrrh. The revenue of the seyid is derived chiefly from the customs, which are farmed out to the banians for about $210,000 annually.—The island of Zanzibar, which extends from lat. 5° 42′ to 6° 37′ S., has an area of 630 sq. m. and a population variously estimated from 100,000 to 380,000. It is separated from the mainland by a strait about 25 m. wide, filled with coral reefs and islets, and navigable only close to the island, which is itself of coral formation. The W. shore is low and indented by many small inlets; the E. presents cliffs of coral reefs about 30 ft. above the level of the sea. The surface of the island, no part of which exceeds 250 ft. in elevation, is undulating. The soil is fertile, and is watered by many small streams. The climate is hot, oppressive, and enervating, and is generally considered unhealthy. A large part of the island is covered with groves of cotton trees, palms, and mangoes, and all the vegetable products of the mainland grow luxuriantly. There are but few wild animals, but all the domestic animals have been introduced. —The city of Zanzibar, or Beled-Zanzibar, called Unguja by the natives, is situated on the W. side of the island, in lat. 6° 10′ S., lon. 39° 14′ E.; pop. estimated in 1875 at 80,000. It is built on a sandy peninsula, which was formerly insulated at high water, but is now connected with the main island by a stone bridge. The town has narrow crooked streets, which are cleaned only by the rains. The principal public buildings are the custom house, the mosques, and the bazaars, the last of which are large and well filled with merchandise. The palace of the seyid and the houses of the foreign merchants are near the sea, opposite the harbor, and this part is much better kept than the city proper. Good water is supplied by aqueducts from small streams in the interior. The population is composed of various races, each of which has separate quarters. The Arabs constitute the bulk of the people, but there are also many negroes, Madagascans, and East Indians. The harbor is good, and generally safe at all seasons, but in 1872 many ships were destroyed there by a cyclone. The port is now the chief market for the ivory, gum copal, and clove trade. It was formerly also a great slave market, but the trade has been abolished by treaty, although it is still carried on surreptitiously on the mainland to a considerable extent.—Zanzibar became independent of Oman in 1862. (See OMAN.) The seyid Majid died in 1870, and was succeeded by his younger brother Burghash. In 1873 the latter concluded a treaty with Great Britain for the suppression of the slave trade, which was supplemented by another treaty signed in 1875, and a more decisive one in 1876. He visited England in 1875. In November, 1875, an Egyptian force occupied several of the seyid's towns in the Somauli country, but retired in December at the request of Great Britain.

ZAPATA, a S. W. county of Texas, bounded W. by the Rio Grande, which separates it from Mexico; area, 1,425 sq. m.; pop. in 1870, 1,488. The surface is level or undulating, with hills in the N. part, and the soil in the valley of the river is fertile. The inhabitants, mostly Mexicans, are devoted to stock raising. The chief productions in 1870 were 7,945 bushels of Indian corn and 37,675 lbs. of wool. There were 4,119 horses, 3,716 milch cows, 3,696 other cattle, and 34,960 sheep. Capital, Carrizo.

ZÁPOLYA. See HUNGARY, vol. ix., p. 57.

ZARA (anc. *Jadera*), a city of Austria, capital of Dalmatia, on a promontory of the Adriatic extending into the gulf of Zara, 74 m. N. W. of Spalato; pop. in 1870, 8,014. It is strongly fortified, and has a spacious harbor, but is exposed to the sirocco and bora. It has a cathedral, five churches (including St. Simon's, with the relics of that saint, and St. Anastasia's, the former cathedral, now the metropolitan church), an arsenal, a museum of art and antiquities, a theatre, and various schools. It is celebrated for the liquors called maraschino and rosoglio, and leather, silk, and linen are manufactured. There are remains of an aqueduct built by Trajan.—Zara stood a celebrated siege by the combined French and Venetians at the beginning of the fourth crusade.

ZARÁND, a S. E. county of Hungary, in the Trans-Tibiscan circle, bordering N. E. and S. on Transylvania; area, 501 sq. m.; pop. in 1870, 63,282. It is mountainous throughout.

The chief river is the White Körös, a tributary of the Theiss. The principal occupations are mining and the raising of cattle. Capital, Körös-Bánya.

ZAUSCHNERIA (named after M. Zauschner, an amateur Bohemian botanist), a brilliant flowering plant introduced from California more than 25 years ago, of which there is only one species, *Z. Californica*, and which has not yet received a common name. It belongs to the evening primrose family (*onagraceæ*), and is a perennial, with numerous stems 1 to 2 ft. high; its ovate or lanceolate leaves, with the rest of the plant, are softly downy; the flowers are sessile in the axils of the upper leaves, and form a kind of raceme; they are about 2 in. long, and have a strong resemblance to those of the fuchsia, which belongs to the same family; the long calyx, situated at the top of the linear ovary, is four-lobed, and the corolla four-petalled, both being of the most brilliant scarlet; eight stamens and the long style project beyond the corolla. It is a very free bloomer, the flowers appearing in late summer and through the autumn. The seeds (generally kept in the seed stores) are each furnished with a tuft of silky hairs by which they are dispersed. It does not succeed in a wet soil, but in a dry and rather sandy one it is hardy near New York, as it is in New England if protected during winter.

Californian Zauschneria (Zauschneria Californica).

ZAVALA, a S. W. county of Texas, drained by the Nueces river and the Rio Leona; area, 1,005 sq. m.; pop. in 1870, 133, of whom 4 were colored. The surface is level. It is devoted to stock raising, and has little land suitable for cultivation. Timber and water are scarce. It is unorganized. In 1870 there were 38 horses, 3,893 cattle, and 270 swine.

ZEA, or Tzia (anc. *Ceos*), an island of Greece, one of the Cyclades, about 15 m. E. of the S. E. extremity of Attica; area, about 70 sq. m.; pop. about 4,000. Mount St. Elias rises in its centre, and at its W. foot is the town of Zea. The island produces wine, excellent fruit, cotton, and silk. In antiquity it was originally inhabited by Ionians. Simonides was a native of the island.

ZEALAND, or Zeeland, a S. W. province of the Netherlands, lying in and around the delta of the Scheldt, bordering on South Holland, North Brabant, Belgium, and the North sea; area, 680 sq. m.; pop. in 1874, 184,215. Besides the mainland S. of the West Scheldt, Zealand comprises the islands of Walcheren, North and South Beveland, Tholen, Duiveland, and Schouwen. The surface is but little above the sea level, but is protected by dikes. The soil is fertile; its healthfulness has been improved by the draining and filling up of the marshes, and large tracts of land have been reclaimed from the sea. Zealand produces madder, hemp, cattle, and sheep, and has linen and other manufactories, salt refineries, and ship yards, and a considerable export trade. The largest towns are Middelburg, the capital, and Flushing.

ZEBRA, the common name of the striped horse-like animals of South Africa, of which one has been described under QUAGGA. They come nearer the ass than the horse, having the tail furnished with long hairs only at the tip, and the hind legs without warts, and have accordingly been placed by Gray in his genus *asinus;* they are whitish or pale brown, elegantly striped with broad black bands. The best known and the handsomest is the common zebra (*asinus zebra*, Gray), rather smaller than the wild horse, which name it bears among the Dutch colonists at the Cape of Good Hope; it is a mountain species, and the bands exist on all parts of the body and limbs, even to the hoofs. The zebras are very wild, living together in herds, going with great rapidity from place to place; they seek the most secluded spots, grazing on the steep hillsides, and posting a sentinel; the senses of sight, smell, and hearing are remarkably acute, and their speed is very great; when attacked by man or beast, they form a compact body, with their heads in

Zebra.

the centre and their heels toward the enemy, defending themselves against the large carnivora by their kicks. The zebra has been used as a beast of burden, and it will cross with the horse and the ass. The flesh is eaten by the natives and hunters in South Africa, and is said to be very good, though coarse.—There is another species (*A. Burchelii*, Fisch.), the *dauw* of the Hottentots, the *peetsi* or *peechi* of the more northern Africans, and the *hippotigris* of the ancients, which occurs as far north as Abyssinia; this, with the quagga, inhabits the plains, and like it has no black bands on the limbs; in the ears and tail, and the symmetry of its form, it is more like the horse than is the common zebra; its voice is a shrill, abrupt neigh, unlike the bray of an ass; it has the mane short and erect.

ZEBU (*bos Indicus*, Linn.), the Brahman bull, a variety of the domesticated ox, characterized by a large fatty hump on the shoulders. It is found in India and its archipelago, China, Arabia, Persia, and on the E. coast of Africa. This variety is very small, sometimes not exceeding a large dog in height; the ears are long and pendulous, and the horns sometimes absent. Zebus are held sacred by the Hindoos, who consider it a sin to kill them, and allow them great liberties; they are made to work, however, and harnessed to a carriage will travel 30 m. a day. The hump is considered by English residents in India delicious eating. It is forbidden to take the bulls out of the country; but a female brought to America, and publicly exhibited here in 1861–'2, gave birth to a male calf on the passage, and there is a male in the Central park, New York, and one in Prospect park, Brooklyn. These specimens have small horns; the female is about the size of a year-old heifer, but with shorter legs, and is of a mixed mouse and hoary gray color, very gentle, and with remarkably soft hair; the male is brown, with coarser hair, and less gentle. The cattle of the Dutch East Indian colonists are mostly of this race, but larger, and considerably crossed with the Sunda ox (*bos Sondaicus*).

Zebu.

ZEBÚ ISLAND. See Cebú.

ZEBULUN, the tenth son of Jacob, the sixth and last by Leah. Of the patriarch Zebulun nothing is known. In the division of territory after the conquest of Palestine, the tribe received an early allotment, reaching according to Josephus from the lake of Gennesaret on the east to Carmel and the Mediterranean. This district included the fisheries of the lake of Galilee, the fertile plain of the Buttauf, and numerous mountain passes valuable for defence. Tabor was on its S. border, and Nazareth, Cana, and Tiberias were within its limits. Zebulun emerges from the general obscurity of the northern tribes during the struggle with Sisera, when it fought bravely side by side with Naphtali; it sent 50,000 warriors to attend David's inauguration at Hebron; it was carried off to Assyria, and after the return from the captivity came in large numbers to Jerusalem to keep the passover of Hezekiah. The tribe was both agricultural and warlike, and from its ports on the Mediterranean seems to have carried on commerce with the Phœnicians.

ZECHARIAH, or **Zachariah**, the eleventh of the twelve minor prophets, who returned from Babylon with Zerubbabel, and began to prophesy in the second year of Darius, king of Persia, 520 B. C., two months after Haggai. The book of Zechariah consists of four general divisions: 1, the introduction or inaugural discourse (ch. i., 1–6); 2, a series of nine visions, extending to ch. vii., communicated to the prophet in the third month after his installation; 3, a collection of four oracles delivered at various times in the fourth year of Darius, with regard to the solemnities that had been observed on account of the overthrow of the nation (ch. vii.); 4, the following chapters (viii. to xiv.) contain a variety of prophecies, unfolding the fortunes of the people, and the fate of many of the surrounding nations, Hadrach (by some supposed to designate Persia), Damascus, Tyre, and Philistia. The book concludes with a vision of the prosperity of Jerusalem, the theocratic metropolis. Zechariah is the longest of the minor prophets. His style is broken and unconnected. The genuineness of the latter portion, from ch. ix. to xiv., the style of which is entirely different from that of the rest, being more archaic and powerful, has been disputed in modern times by Hitzig, Knobel, Davidson, and others, but it has also found defenders. Special commentaries on Zechariah have been written by Forberg (1824), Howard (1824), Baumgarten (1860), Kliefoth (1862), and Pressel (1870).

ZEDEKIAH. See Hebrews, vol. viii., p. 589.

ZEELAND. See Zealand.

ZEILAH, or **Zaylah**, an Egyptian seaport, on the gulf of Aden, in the Somauli country, about 100 m. S. of the strait of Bab-el-Mandeb; pop. about 5,000. It is the only port on that part of the coast, and is the outlet of an extensive interior region, the chief place of which is Harar, a large walled town eight days' journey to the southwest. Zeilah is built on a low sandy point, and is surrounded by a mud wall. The anchorage in the harbor is shallow, and large vessels cannot approach within a mile of the landing. There is a considerable trade with Arabian ports, the chief exports being ivory, myrrh, ostrich feathers, and gums. This port, the last foothold of Turkey on the African coast of the Red sea, was ceded to Egypt by the sultan in July, 1875, in consideration of £15,000 additional tribute.

ZEISBERGER, David, a Moravian missionary, born at Zauchtenthal, in Moravia, April 11, 1721, died at Goshen, Tuscarawas co., Ohio, Nov. 17, 1808. He was educated by the Moravians in Saxony, and afterward lived at their settlement of Nerrendyk, Holland. Thence he went to England, and was aided by Gen. Oglethorpe in joining his parents, who had several years before emigrated to Georgia. He went to the north in 1740, and was one of the founders of the Moravian colony of Bethlehem, Pa. Soon afterward he became a missionary to the Indians, and labored among the Delawares at Shamokin, Pa., and the Iroquois at Onondaga, till after the breaking out of war in 1754. On the return of peace after the conspiracy of Pontiac, he led the remnant of the Christian Indians, who had found a refuge in Philadelphia, to Wyalusing on the Susquehanna, in Bradford co., Pa. In 1767 he established a church among the Monseys on the Alleghany, in what is now Venango co. In 1772 he penetrated the wilderness still further, explored the Muskingum region, and laid out a town, Schoenbrunn, on the Tuscarawas, about 10 m. from the present Canal Dover, Ohio. In time he was joined by all the Moravian Indians of Pennsylvania. Two more villages were built, and other missionaries were employed. In 1781 a body of Wyandot warriors, instigated by the British commandant at Detroit, broke up these settlements and compelled the Christian Indians to remove to Sandusky. Zeisberger and his assistants were grossly maltreated. In March, 1782, 96 of his flock, men, women, and children, who had gone from Sandusky to their former homes to gather their corn, were treacherously murdered at Gnadenhütten by a party of the white settlers. This was a death blow to the Moravian mission among the Indians. Most of the converts dispersed; with a small remnant Zeisberger went to the Clinton river, and built an Indian town, in what is now the state of Michigan. In 1786, at the head of his little band, he went back to the S. shores of Lake Erie, and in 1787 began a new settlement, which he called New Salem, one mile from the lake (now in Huron co., Ohio); but in 1791 the hostility of other Indians obliged them to emigrate to Canada, where they founded Fairfield, on the river Thames. In 1798, congress having granted to the Moravian Indians the tract of land in the valley of the Tuscarawas upon which they had formerly been settled, Zeisberger returned with some of his converts, and established a new station, to which he gave the name of Goshen. There he preached until the close of his life. His published works are: a Delaware and English spelling book (Philadelphia, 1776); a collection of hymns in Delaware (1803); "Sermons to Children," in Delaware (1803); a "Harmony of the Four Gospels," in Delaware (New York, 1821); and an essay on Delaware conjugation, in Vater's *Analekten der Sprachkunde* (Leipsic, 1821). Other important works of his relating to the Indian languages remain in manuscript; among the rest a Delaware grammar and dictionary, in the library of Harvard university, and an Iroquois dictionary, deposited in the library of the American philosophical society at Philadelphia.—See "Life and Times of David Zeisberger," by Edmund Alexander de Schweinitz (Philadelphia, 1870), and John Heckewelder's "Narrative of the Missions among the Delaware and Mohegan Indians" (Philadelphia, 1820).

ZEITZ, a town of Prussia, in the province of Saxony, on the White Elster, 23 m. S. S. W. of Leipsic; pop. in 1871, 15,417. From 1663 to 1717 it was the capital of the sovereign duchy of Saxe-Zeitz. The ducal residence is now a penitentiary. The town has a gymnasium and an industrial school. Cotton and woollen cloths, pianos, and leather are manufactured in increasing quantities. There are large coal mines in the vicinity.

ZELLE. See CELLE.

ZELLER, Eduard, a German scholar, born at Kleinbottwar, Würtemberg, Jan. 22, 1814. He studied in Tübingen under Strauss and Baur, and in Berlin under Neander, lectured on theology in the former university, and was one of the founders of the *Theologische Jahrbücher*, the organ of the new Tübingen school. Despite the opposition of the orthodox Swiss, he was professor of theology at Bern from 1847 to 1849. In the latter year he became professor of philosophy at Marburg, in 1862 at Heidelberg, and in 1872 at Berlin. He has published *Platonische Studien* (Tübingen, 1839); *Die Philosophie der Griechen* (3 vols., 1844–'52; 2d ed., revised, 1856–'68; 3d ed., 1869–'76; English translation, "Socrates and the Socratic Schools," by O. J. Reichel, London, 1868, and "The Stoics, Epicureans, and Sceptics," by the same, 1869); *Geschichte der christlichen Kirche* (Stuttgart, 1847); *Das theologische System Zwingli's* (Tübingen, 1853); *Die Apostelgeschichte nach ihrem Inhalt und Ursprung* (Stuttgart, 1854; English translation, "The Acts of the Apostles critically Examined," by Joseph Dare, London, 1875); *Vorträge und Abhandlungen* (Leipsic, 1865; 2d ed., 1875–'6); *Staat und Kirche* (1873); and *David Friedrich Strauss in seinem Leben und seinen Schriften geschildert* (1874; English translation, London, 1874).

ZELLER, Jules Silvain, a French historian, born in Paris, April 23, 1820. He has taught history at Bordeaux, Rennes, Strasburg, and Aix. In 1858 he became *maître de conférences* at the normal school in Paris, and a lecturer at the Sorbonne. In 1869 he succeeded Duruy in the polytechnic school, and in 1874 Michelet in the academy of moral and political sciences. He has published *Ulrich de Hutten* (1849); *Histoire de l'Italie* (1852); *Épisodes dramatiques de l'histoire d'Italie* (1855); *L'Année historique* (4 vols., 1860-'63); *Les empereurs romains* (1863); *Entretiens sur l'histoire* (1865); and *Histoire d'Allemagne* (1872).

ZELTER, Karl Friedrich, a German composer, born in Berlin, Dec. 11, 1758, died there, May 15, 1832. He was bred a mason and builder. Forbidden to indulge his musical tastes, he secretly walked to Potsdam, about 20 m., to take his weekly lessons of Fasch, whom in 1800 he succeeded as director of the Berlin *Sing-Akademie.* In middle life he divided his time between his art and his trade, in which he employed many workmen. From 1809 till his death he was professor of music at the academy of arts and sciences. He founded in 1809 the *Liedertafel*, a male-voice society, for which he composed many part songs, and which was the first of this class of clubs, now so common in Germany, England, and America. His most important composition was his *Auferstehung und Himmelfahrt Christi.* He also composed much church music. He was an intimate friend of Goethe, his correspondence with whom was published after his death (6 vols., Berlin, 1833-'4). His life has been written by Dr. W. Rintel (Berlin, 1861).

ZEMPLÉN, or **Zemplin,** a N. county of Hungary, in the Cis-Tibiscan circle, bordering on the counties of Ung, Szabolcs, Borsod, Abauj, and Sáros, and on Galicia, from which it is divided by the Carpathians; area, 2,392 sq. m.; pop. in 1870, 292,771, chiefly Slovaks and Magyars. The Theiss forms most of the S. frontier, and the Hernád part of the S. W. The northern part of the county is mountainous and little productive; the southern is very fertile. The S. W. portion includes the Hegyalja, a region partly mountainous and partly hilly, famous for the production of the Tokay wine; the best vineyards are in the vicinity of the towns of Tállya, Mád, and Tokay. Capital, Sátoralja-Ujhely.

ZENAIDA DOVE. See PIGEON, vol. xiii., p. 506.

ZENANA. See supplement.

ZEND-AVESTA, the scriptures of the Zoroastrian faith, the ancient national religion of Persia, now professed only by scanty communities of Parsees. The proper name is simply *Avesta*, while *Zend* means the translation of it into the Huzvaresh (now usually called the Zend), which is the literary form of the Pehlevi language, probably made some centuries after Christ. This language, the oldest form of Iranic speech known, has been named by Spiegel the Old Bactrian. (See IRANIC RACES AND LANGUAGES.) Zend-Avesta, however, if understood to mean the Avesta and its Zend, is a suitable name for the whole Parsee sacred literature, ancient and modern, and will be here accepted as such. The Avesta is one of the most ancient and interesting documents remaining to us for the early history and religion of the Indo-European family. It is made up of several distinct parts. First in importance among these are the *Vendidad* and the *Yaçna.* The former is, as it were, the Pentateuch of the Zoroastrian canon, the book of origins and of the law. It is in great part prescriptive, a moral and ceremonial code, teaching the means of avoiding or of expiating sin and impurity. It is cast chiefly in the form of colloquies between the supreme divinity, Ahura-Mazda (Ormuzd), and his servant and prophet Zarathustra (Zoroaster), in which the former makes known to the latter his will respecting his creation. The same form prevails more or less through the whole Avesta; it is professedly a revelation to Zoroaster, and through him to mankind. The Vendidad is evidently not preserved complete, nor is it certain that its few first and last chapters originally belonged to it. The Yaçna is of a very different character, being made up of prayers and praises addressed to the divinity and to the beings inferior to him, yet recognized as worthy of reverence and worship. It is divided into two distinct portions, of which the latter is in a slightly different and apparently older dialect, and is in great part metrical, resembling in form and contents the hymns of the Hindoo Veda; these songs are plainly the most ancient and original part of the Avesta, and some of them may go back even to the time of Zoroaster himself; that they do so is the opinion of Dr. Haug, who published an annotated translation of them in the German oriental society's collections (*Die fünf Gâthâs*, &c., Leipsic, 1858-'60); they have also been edited, with version and notes, by Kossowicz (1867-'71). The *Vispered* is kindred in character with the more recent part of the Yaçna; these two, along with the Vendidad, are mingled together in the liturgical use of the Parsees. The other constituents of the Avesta are sometimes spoken of as the *Khordeh Avesta*, or shorter Avesta; they are the 24 *Yeshts*, laudations of sacred persons or objects, the five *Nyâyish*, and a few other less important pieces. The Parsees hold that Zoroaster's writings originally filled 21 volumes, which were in great part lost in the ruin of the Persian empire and religion after Alexander, only fragments of them being recovered and preserved by the Sassanian monarch Ardeshir, excepting the Vendidad, which had been saved entire. The Avesta is clearly an assemblage of fragments of a more extended literature, and many circumstances favor the theory of its collection into its present form during the early part of the Sassanian period. Its material is of different ages, and some of it must be many centuries older than our era. Its place of origin, as that of the Zoroastrian religion, is believed to be the northeastern part of Iran, in or not far from Bactria, which is also the principal scene of action of the Persian legendary history.—The Zend, or literature auxiliary to and explanatory of the Avesta, consists chiefly of its translated text with accompanying glosses, and also a few independent works in the same language, the Huzvaresh or literary Pehlevi, as the *Bundehesh* and the *Din-kart*, of much later date. It is an important aid to the understanding of the Avesta; yet its interpretation is not to be implicitly accepted. (See Spiegel, *Einleitung in die traditionellen Schriften der Parsen*, 2 vols. 8vo, Leipsic, 1856–'60, and Haug, "Essay on Pahlavî," London, 1870.) That part of the Zoroastrian literature which is composed in the so-called Parsee dialect is of still more modern date and limited extent. Glosses or interpretations of the Avestan texts, called *Pa-Zend*, versions of certain portions of them and of Pehlevi texts, sundry invocations and ascriptions of praise, and expositions of Parsee doctrine, constitute nearly its whole substance. Spiegel has published (Leipsic, 1851) a Parsee grammar, with considerable passages of texts appended. After the settlement of the Parsees in India, a Sanskrit version was made by Neriosengh of the Yaçna and some other parts of the Avestan text; it has been published in a Latin transliteration by Spiegel (Leipsic, 1861). In recent times also learned and enlightened Parsees have been active in editing and commenting their scriptures, and rendering them accessible in the present vernacular of their community, the Guzeratee language. Spiegel has published a translation of the whole Avesta into German (English ed. by A. H. Bleek, London, 1864), and a commentary on both text and translation (2 vols., 1865–'8). The difficulties which attend the understanding of the Avesta are greater even than those which beset the Veda; the methods to be pursued, and the part to be assigned to the different sources of auxiliary knowledge, are still unsettled, the foremost scholars holding very different views. Spiegel's *Erânische Alterthumskunde* (2 vols., Leipsic, 1872–'3) is an elaborate discussion of the ancient Persian history and religion. (See Ormuzd.)

ZEND LANGUAGE. See Zend-Avesta.

ZENICK. See Suricate.

ZENITH (Arabic), that point in the heavens which is precisely over the head of the observer. The point directly opposite under his feet is called the nadir.

ZENO, a Greek philosopher, born in Elea, in southern Italy, about 490 B. C. He was a pupil of Parmenides, and resided at Elea all his life, with the exception of occasional visits to Athens as a teacher, having Pericles and other wealthy men among his scholars. Having engaged in a conspiracy against a tyrant of Elea, he was made a prisoner and called upon to denounce his accomplices. In reply he is said to have named all the personal friends of the tyrant, and to have then thrown in his face his own tongue that he had just bitten off. He was thereupon tortured and put to death. He was the first of the Eleatic school to write in prose, and Aristotle calls him the inventor of dialectics. He contended that there is in reality no such thing as motion. (See Eleatic School.) None of his works are extant.

ZENO, a Greek philosopher, founder of the stoic school, born at Citium in the island of Cyprus about 358 B. C., died in Athens about 260. His father, according to Diogenes Laërtius, was a merchant, and he followed the same profession until he lost a ship with a rich cargo. Henceforth he devoted himself to philosophy. At first he attached himself to Crates, but afterward sought the instructions of Stilpo, from whom he went to Diodorus Cronus, the great dialectician of the Megarean school, after which he followed the lectures of Xenocrates and Polemon, who had succeeded Plato at the academy. About 310 Zeno opened his own school, which took its name from being held under the Στοά Ποικίλη or painted porch. (See Stoics.) To avoid a crowd, he required the payment of a small sum from his disciples, among whom was the king of Macedon Antigonus Gonatas, while Ptolemy Philadelphus of Egypt ordered his ambassadors at Athens to take down the words of the philosopher that they might be reported to him. He was at the head of his school for half a century, respected for the austerity of his life and the boldness of his language. There is a story that the Athenians, from their great confidence in his integrity, intrusted to him the keys of their citadel; and after his death, at the age of 98, according to Diogenes, they decreed that by exciting the youth to wisdom and virtue, and giving in his own life an example thereof, he had deserved well of the republic, wherefore they awarded to him a golden chaplet and a public tomb in the Ceramicus. Of his writings only a few fragments remain.

ZENO, an emperor of the East, who reigned from A. D. 474 to 491. He was an Isaurian by birth, married the daughter of Leo I., commanded the imperial guards and armies, and was made consul in 469. He procured the assassination of Aspar, the minister of Leo, in 471; and on the death of Leo in 474, his own son, aged three years, was proclaimed emperor as Leo II., with himself as coregent. His son dying the same year, Zeno became emperor. He was driven out of his capital by Basiliscus, who was proclaimed emperor in 475, but regained Constantinople in 477 by buying over Harmatius, the nephew and general of Basiliscus, who was deposed and died shortly afterward. Zeno now gave himself up to pleasure, while the government was carried on by Illus, sole consul and minister. In 478 a Gothic invasion was bought off; in 479 a revolt in Constantinople was put down by corrupting the troops engaged; a second Gothic invasion was bought off, and a third was repelled by purchasing the aid of an opposing party among the Goths, one of whose chieftains, afterward Theodoric the Great, was made consul in 484, after which Illus revolted, was defeated, and put to death in 488. Having quarrelled with Theodoric, Zeno, anxious to save himself and his capital, proposed to him the invasion of Italy which resulted in the foundation of a Gothic kingdom in that country. The bloody disputes between the Monophysites and the orthodox began under Zeno's reign. (See BYZANTINE EMPIRE.) It is said that his wife had him buried alive while he was drunk. He left no children, and was succeeded by Anastasius.

ZENO, Apostolo, an Italian poet, born in Venice, Dec. 11, 1668, died there, Nov. 11, 1750. He wrote many successful dramas and furnished librettos for several operas; founded in 1710 the *Giornale de' letterati d'Italia*, which still exists; went to Vienna in 1715 on the invitation of Charles VI., and was appointed court poet and historiographer. He retired in 1729, recommending Metastasio as his successor, and returned to Venice on a pension. His dramatic works were published collectively in 1744 (10 vols., Venice) and in 1795 (12 vols., Turin). He also wrote the life of Davila and other biographies; *Istorici delle cose veneziane* (10 vols., Venice, 1718–'22); *Dissertazioni istorico-critiche e letterarie agli istorici italiani* (2 vols., Venice 1752–'3); and *Epistole* (3 vols., 1752; 2d ed., enlarged, 6 vols., 1785).

ZENO, Nicolò and Antonio, two Italian navigators, born about the middle of the 14th century. They were members of one of the noblest Venetian families, and brothers of Carlo Zeno, grand admiral of Venice. About 1390 Nicolò went on a voyage of discovery into the northern seas, was wrecked on what he describes as the island of Frislanda, supposed to be one of the Faroe isles, and was rescued from wreckers by the chief of a neighboring principality, whom he calls Zichmini. After serving this chieftain as pilot of his fleet for a year or two, he wrote a letter giving an account of his voyage to his brother Antonio, who soon after joined him. Nicolò died in Frislanda four years after his brother's arrival; and Antonio, after remaining ten years longer in the service of Zichmini, returned to Venice, where he died about 1405. From the above mentioned letter from Nicolò to Antonio, and from other letters from Antonio to his brother Carlo, a narrative was compiled and published in 1558 by Nicolò Zeno, a descendant of Antonio. This was accompanied by a map illustrative of the account, which was found in the palace and supposed to be by one of the brothers. The narrative gives an account of a visit made by both to the Shetland isles, and by Nicolò to Greenland, with details concerning the colonies there, and of the voyages of fishermen to an island called Estotiland, supposed to be Newfoundland, and to a country called Drogeo, conjectured to be on the mainland of North America. This narrative, which if true would seem to prove that the new world was visited by Venetians a century before the discovery by Columbus, has been severely assailed by several writers, especially Admiral Zahrtmann of the Danish navy; but Mr. R. H. Major, in a communication to the royal geographical society of London, upholds its general accuracy, and shows Zichmini to be Henry Sinclair, earl of Orkney. (See "Journal of the Royal Geographical Society," 1873.)

ZENOBIA, Septimia, queen of Palmyra. She was the daughter of an Arab chief, and had by her first husband a son named Athenodorus Vaballathus, whom she is said to have invested with the purple when she attained to power. Her second husband was Septimius Odenathus, prince of Palmyra, who after the surrender of the emperor Valerian to Sapor, king of Persia, pursued and twice defeated the latter, was afterward associated by Gallienus in the government of the empire with the title of Augustus, and was assassinated in A. D. 266 by his nephew Mæonius. Zenobia put the assassin to death, and assumed the vacant Palmyrene throne. For five years she governed Palmyra, Syria, and adjoining parts of the East with vigor and judgment, independent of the Roman power, and compelled one of the Roman generals sent against her to retreat with loss into Europe. She assumed the title of queen of the East, and exacted from her subjects the same adoration that was paid to the Persian monarchs. She maintained her power through the reigns of Gallienus and Claudius, but in 272 Aurelian defeated her in two pitched battles, one at Antioch, the other at Emesa, when she shut herself up in Palmyra, and prepared for a vigorous defence. To an advantageous capitulation offered by Aurelian she returned an insulting refusal, confiding in her eastern allies, and in the famine which she trusted would assail the Romans. Disappointed in both, she prepared to fly, but was captured after reaching the Euphrates, 60 miles from Palmyra (273). To the demand of Aurelian why she had taken up arms against the emperors, she replied: "Because I disdained to consider as Roman emperors an Aureolus or a Gallienus; you alone I acknowledge as my conqueror and my sovereign." She sacrificed her ministers, one of whom was the celebrated Longinus, to the resentment of Aurelian. She adorned the triumph of the emperor, but was presented by him with an elegant villa at Tibur, where she passed the rest of her life. Her daughters married into noble Roman families, and her descendants were still living in the 5th century. Zenobia was exceedingly beautiful, dark in complexion, with large, black, fiery eyes. She spoke Latin, Greek, Syriac, and Egyptian, and wrote for her own use an epitome of oriental history. She was a passionate hunter, and thoroughly inured to fatigue, sometimes walking on foot at the head of her troops. The emperor gave her son Vaballathus a small principality in Armenia.

ZEOLITE (Gr. ζεῖν, to boil), the name given to a family of minerals, which, though in some respects unlike, have the common characteristic of melting and intumescing in the flame of the blowpipe. They consist chiefly of silica, alumina, some alkali, and more or less water; the latter two account for their dissolution under heat. Most of them also gelatinize in acids, by separation in such state of the silica. As found, they fill cavities or form narrow seams in rocks, are implanted on their surface, or more rarely imbedded in them, but are never, like agates, disseminated throughout the rock. They all occur in amygdaloid, some of them in granite or gneiss. Among them are heulandite, laumonite, natrolite, stellite, analcime, sodalite, lapis lazuli, &c. (See LAPIS LAZULI, and LAUMONITE.)

ZEPHANIAH, one of the twelve minor prophets, a descendant of Hezekiah, supposed by many to be the king of that name. He prophesied in the reign of King Josiah, about 625 B. C. His prophecy consists of three chapters. The first is a general threatening against all the people whom the Lord had appointed to slaughter, and in particular against Judah and the Philistines. In the second he inveighs against the Philistines, Moab, Ammon, and Cush, and foretells the fall of Nineveh. The third contains invectives and threatenings against Jerusalem, but afterward gives comfortable assurance of a return from captivity. Among the best commentaries are those by Hitzig (3d ed., 1863), Reinke (1868), and Kleinert (in Lange's *Bibelwerk*, 1868).

ZERAM. See CERAM.

ZERBST, a town of Germany, in the duchy of Anhalt, on an affluent of the Elbe, 22 m. S. E. of Magdeburg; pop. in 1871, 11,957. It has four Protestant churches, including the fine Gothic Nikolaikirche, restored in 1827, and a large town hall with a Bible in parchment containing pictures by Lucas Kranach. The Anhalt penitentiary was formerly a convent. Four annual horse fairs are held, and there are manufactories of gold and silver ware, silk, and other articles, including the celebrated Zerbst bitter beer. It was for many centuries the capital of Anhalt-Zerbst, which became extinct in 1793. (See ANHALT.) The beautiful palace where the princes of that house resided adjoins the town.

ZETLAND. See SHETLAND ISLANDS.

ZETTERSTEDT, Johan Wilhelm, a Swedish naturalist, born in Ostergötland, May 20, 1785, died in Lund, Dec. 23, 1874. He taught botany and natural history in the university of Lund from 1810, made several scientific journeys through northern Europe, and in 1839 was appointed professor of botany and economy. He published *Dissertatio de Fœcundatione Plantarum* (3 vols., Lund, 1810–'12); *Insecta Lapponica* (Leipsic, 1838–'40); and *Diptera Scandinaviæ* (14 vols., Lund, 1842–'60), for which he received the great Linnæus medal from the Stockholm academy of sciences.

ZETTINIE, or Zettinje. See CETTIGNE.

ZEUGLODON (Gr. ζεύγλη, a yoke, and ὀδούς, a tooth), a gigantic fossil cetacean mammal, found in the eocene and miocene tertiary strata of the southern United States and Europe, so named by Owen from the yoke-like character displayed by a section of the molar teeth. Its remains were first discovered in 1832 in the tertiary of Louisiana, and were supposed to belong to some huge saurian reptile, to which Dr. Harlan gave the name of *basilosaurus;* he carried the bones to London in 1839, where Owen showed by microscopic examination of the teeth, and the fact that the molars were double-rooted and implanted in double sockets, that it was not a reptile but a cetacean mammal, and belonged somewhere near the manatee and dugong. In 1835 Prof. Agassiz established the genus *phocodon*, from the examination of a tooth in the museum of Cambridge, England, regarding its possessor as nearly allied to the seal family; this was the very specimen figured by Scilla in 1747, in his work *De Corporibus Marinis*, and was obtained from the miocene of Malta; if *phocodon* be a synonyme of *zeuglodon*, the former has a priority of four years over the latter, and according to the rules of scientific nomenclature should be adopted, and with the more reason as the animal in question bears affinities to the seals in more respects than in the form of the teeth. In 1840 M. Grateloup described the fragment of an upper jaw with teeth found in the eocene of France, a few leagues south of Bordeaux, which he believed to characterize a new order of amphibious reptiles, carnivorous and marine, perhaps a connecting link between the lacertians and the sharks, and for which he proposed the name of *squalodon.* In 1845 Dr. R. W. Gibbes described some teeth which he referred to a genus called by him *dorudon*, now recognized as belonging to the zeuglodon. The materials for the study of this animal have been extensively collected, though its exact position in the scale of mammals is not established beyond dispute. In 1843 Mr. Buckley found a considerable series of bones of zeuglodon in Clark co., Ala.; they consisted of a chain of 40 vertebræ, with a portion of the skull and lower jaw, a perfect humerus, and a few other bones, measuring in total length about 70 ft.; some of the vertebræ are 18 in. long and 12 in. in diameter on the articulating surfaces, and many are nearly perfect; the specimen belongs to the collection of the late Dr. J. C. Warren of Boston. About the same time Mr. Koch, a German collector, obtained from the marly limestone of Alabama a considerable quantity of these bones, which were put together, embracing parts of different skeletons, and exhibited in most of the northern cities as the *hydrarchus Sillimani*, or great marine serpent. Prof. Wyman and others questioned the authenticity of this collection, which was carried to Dresden, and there described by Carus as a reptile, though

Burmeister and Müller maintained that it belonged to a mammal. It was afterward purchased by the king of Prussia for the palæontological museum in Berlin. There is a specimen in the Boston society of natural history, containing 36 vertebræ and 26 fragments of ribs and other bones. From all these sources it is known that the cranium was much elongated, and narrowed behind the frontal bones; the occipital region much and steeply elevated, as in the hog; frontals very wide above the orbits; face slender, with elongated nasal bones, and normal nasal openings unlike those of the cetaceans; intermaxillaries long and slender, and the lower jaw resembling that of the dolphins and sperm whales; the occipital condyles are two as in mammals, and the squamous cranial sutures and bones of the ear as in cetaceans. The cervical vertebræ are very short; the dorsals elongated, with small spinous and transverse processes, the former consolidated to the cylindrical bodies, but not contiguous; their epiphyses are several inches thick, whereas in the cetaceans in bones of equal size they form plates not more than half an inch thick; the bodies of the caudal vertebræ are very long; the ribs are short, of a dense laminated structure, somewhat thickened at the lower extremities, as in the *sirenia;* bones of arm small, the distal end of the humerus being suddenly contracted, and having the articulating surface of a hinge-like joint. The form was probably cetacean, though slender, elongated, and more snake-like, with small anterior limbs like paddles, and no posterior extremities; from the long chain and characters of the vertebræ, and the shortness of the ribs, as figured by Pictet, it seems that the spinal column must have been freely movable in its several parts, presenting no anatomical impossibility to the zeuglodon's performing the part of a tertiary and perhaps modern sea serpent. (See SEA SERPENT.) The dentition is peculiar; in the largest and best known species (*zeuglodon cetoides*, Owen) the formula is: incisors $\frac{3}{4}-\frac{3}{4}$, abnormal canines $\frac{1}{0}-\frac{1}{0}$, and molars $\frac{5}{5}-\frac{5}{5} = 36$; the anterior teeth are conical, the molars being compressed, serrated on the edges, and double-rooted; the interval between the long roots of the molars is continued by a marked depression on the sides of the crown, so that when the teeth are much worn each presents two surfaces united by a thin connecting substance, whence the name given by Owen; the prior name of *phocodon* of Agassiz is just as proper on account of the serrations of the cutting edges, like those seen in many seals, to which family some authors have approximated it. The dentition of the zeuglodon and the nasal openings prove that it was not a typical cetacean, and the molars and shape of the head also remove it from the dugong and manatee; yet the affinities seem nearer to these aquatic types than to any other. In the mode of completion and succession of the teeth, according to Owen, it belongs to a higher type than that of any of the existing cetaceans; he therefore regards it as an interesting link between these (sperm whale, dolphin, &c.) and the *sirenia* (dugong and manatee).—For fuller details and plates, besides the works quoted, see "Journal of the Academy of Natural Sciences of Philadelphia," 2d series, vol. i. (1847), pp. 5–17, including papers by Messrs. Gibbes and Tuomey. Several species are described.

ZEUS. See JUPITER.

ZEUXIS, a Greek painter, born probably in Heraclea in Bithynia about 450 B. C., died probably in Athens in the first half of the following century. He was a contemporary of Apollodorus of Athens and of Parrhasius, and was one of the leaders of the Asiatic or Ionic school, which succeeded the Athenian. His peculiar excellences consisted in a grand style, great mastery of form, effective coloring and chiaroscuro, a dramatic effect of composition, and felicity in the choice of subjects. He also exhibited to perfection that accuracy of imitation and skill in depicting sensual charms which formed the chief characteristics of his school. On the other hand, according to Aristotle, he failed to present character in such a manner as to elevate the feelings and moral sentiments of the spectator, excelling rather in expressing the ideal standard of human beauty, or in imitating such natural objects as are incapable of an ideal representation. His most celebrated work was his Helen, painted for the city of Croton, which was designed, it is said, after five of the most beautiful virgins of that place, and continued for many ages to be visited by artists as the recognized type of female beauty. Among his other famous works were a Hercules strangling the serpents, which he presented to the Agrigentines, Jupiter in the assembly of the gods, a Penelope, a Marsyas, a Cupid crowned with roses, and a family of centaurs. Late in life he had a contest with his young rival Parrhasius for the preëminence in their art, of which the following is narrated: Zeuxis painted some grapes with such exactness as to deceive the birds, which pecked at them; but Parrhasius, by a representation of a curtain which apparently concealed a picture, deceived Zeuxis himself, and was adjudged the better painter. At another time Zeuxis painted a boy carrying grapes, at which the birds also flew; but in this instance the artist was displeased at his success, remarking that if the boy had been as well painted as the grapes the birds would have feared to approach the picture. A great portion of the life of Zeuxis was passed in Ephesus, but he also painted in Macedonia, in Athens, and in the Greek colonies of Italy.

ZHITOMIR, a town of S. W. Russia, capital of Volhynia, 83 m. W. of Kiev; pop. in 1867, 37,640, including chiefly Russians, Poles, and Jews. It has a Catholic and six Greek churches and several synagogues, a handsome theatre, and a literary society. Its trade and manufactures are important.

ZHUKOFFSKI, Vasili, a Russian poet, born in 1783, died in Baden-Baden, April 24, 1852. He studied in Moscow, and in 1808–'9 edited the *Viestnik Evropi* ("European Messenger"), then the leading periodical in Russia. In 1812 he fought against Napoleon, and wrote stirring war songs and a great national hymn. He afterward gave lessons in Russian literature to the future wife of Nicholas, from 1824 to 1848 was tutor to the grand duke, the present emperor Alexander II., and subsequently resided in Germany. He was the founder of a romantic school, and the first Russian poet to compose ballads, the best being *Svietlana*, and to introduce the iambic metre. He also wrote tales, the finest of which is *Marina roshtcha* ("Mary's Grove"), and translated Gray's "Elegy," Byron's "Prisoner of Chillon," ballads of Goethe and Uhland, and Schiller's *Jungfrau von Orleans;* his masterpiece is *Liudmila*, a version of Bürger's *Leonore.* Several of his pieces are contained in Sir John Bowring's "Specimens of the Russian Poets" (1824). His works have been collected in 10 volumes (St. Petersburg, 1849–'50).

ZIBETH. See CIVET.

ZIDON. See SIDON.

ZIEM, Félix, a French painter, born in Beaune about 1822. He studied in Paris, travelled in the East and Italy, and produced "View of the Bosporus," "The Grand Canal of Venice," and many other pictures relating to Venice, Antwerp, Marseilles, and Constantinople. His views of Venice are especially celebrated. One of his most effective pictures is "Vesuvius."

ZIETHEN, Hans Ernst Karl, count, a Prussian soldier, born March 5, 1770, died at Warmbrunn, Silesia, May 3, 1848. He distinguished himself in the wars against Napoleon I. (1813–'15), especially at Waterloo, when his corps appeared on the French right and checked Ney's advance. (See WATERLOO.) Subsequently he was stationed at Sedan at the head of the Prussian army of occupation. On returning home he was made a count and commander-in-chief in Silesia, and he retired in 1835 with the rank of general field marshal.

ZIETHEN, Hans Joachim von, a Prussian soldier, born near Ruppin, May 18, 1699, died in Berlin, Jan. 26, 1786. He became known in 1730 in connection with a regiment of hussars at Berlin which was subsequently celebrated. After a long service in the army he especially distinguished himself in 1745 at Hohenfriedberg and Hennersdorf, where he was wounded. Frederick the Great was subsequently alienated from him till 1755, after which he was his special favorite and next to Seydlitz his ablest general in the seven years' war. In his 79th year he offered to serve in the war of the Bavarian succession. Monuments have been erected to him at Rheinsberg and Berlin, the latter, by Schadow, on the Ziethenplatz. His life was written by Hahn (4th ed., 1867).

ZIMMERMANN, Albert, a German painter, born in Zittau, Saxony, in 1809. He studied in Munich, and in 1837 became professor at the academy of Milan. He excels in landscapes. His works include "The Brocken and its Witches," "The Finding of Moses," "Lake Lugano," "Dawn," and a "Mountain View during a Storm," considered his masterpiece.—His brothers August Robert (1818–'64) and Richard (1820–'75) were well known landscape painters, as is his brother August Maximilian or Max.

ZIMMERMANN, Clemens von, a German painter, born in Düsseldorf, Nov. 8, 1789, died in Munich, Jan. 24, 1869. He was educated at Düsseldorf and Munich, and first attracted attention by a picture of the "Sacrifice of Noah." In 1815 he became director of the gallery at Augsburg, and in 1825 professor of painting at the academy in Munich; and he was director of the central gallery there from 1846 to 1865. He was one of the artists employed to decorate the Glyptothek and the Pinakothek, where he executed the fresco designs of Cornelius. He also executed for the dining hall of the royal palace a series of subjects from Anacreon. One of his most important single works, a colossal "Assumption of the Virgin," is in a church at Claire Village, Australia. His subsequent oil paintings comprise "The Conversion of Saul" and "The Conquest of Jerusalem by the Crusaders."

ZIMMERMANN, Johann Georg von, a Swiss author, born at Brugg, canton of Bern, Dec. 8, 1728, died in Hanover, Oct. 7, 1795. He was educated at the university of Göttingen, pursuing under the direction of Haller an extremely comprehensive course of study with such zeal that his health became permanently impaired. In 1751 he took the degree of M. D., producing a physiological dissertation on "Irritability," which is still held in esteem. He commenced practice at Bern in 1752, but soon removed to Brugg, and attained the highest rank in his profession. Patients resorted to him from all parts of central Europe, depriving him of leisure for study and research. He became in consequence discontented with his position, and the symptoms of melancholy which had appeared during his residence in Göttingen were gradually developed into hypochondria. He avoided society, and passed his leisure hours in reading or meditation, and during this period published his biography of Haller and the first sketch of his well known work "On Solitude" (*Ueber die Einsamkeit*, Zürich, 1755). His deportment in the sick room was invariably cheerful, and amid his deepest fits of despondency he strove to inspire confidence and hope in his patients. In 1758 appeared his treatise on "National Pride" (*Vom Nationalstolze*), which attracted much attention from the clearness and moderation of its views, and was speedily translated into the chief European languages. His work on "Experience in Medicine" (*Von der Erfahrung in der Arzneikunst*, 2 vols., 1764; English translation, 2 vols., London, 1782) likewise obtained a European reputation, and was instrumental in procuring for him the offices of aulic councillor and physician to the court of Hanover, to which place he removed in 1768. Excessive employment here brought on an internal disorder requiring a visit to Berlin for an operation in 1771, during which he made the acquaintance of Frederick the Great. After a few months he was restored to health, but domestic afflictions plunged him into a fit of unusual despondency. After a second marriage he succeeded in throwing off in a measure his habitual gloom. He now published his completed work "On Solitude" (4 vols., Leipsic, 1784–'5), which obtained an immense popularity throughout Europe, and is the most matured of all his productions, and that with which his name is now most commonly associated. Zimmermann attended Frederick the Great during his last illness at Berlin in 1786, and published *Ueber Friedrich den Grossen und meine Unterredung mit ihm kurz vor seinem Tode* (Leipsic, 1788), and *Fragmente über Friedrich den Grossen* (3 vols., 1790 *et seq.;* English translation, "Select Views of the Life, Reign, and Character of Frederick the Great," by Major Neumann, 2 vols., 1792). These works involved him in bitter controversies with public men whose characters he had assailed, and were in general so full of coarse calumny and mendacity as to render it certain that he was entering a more dangerous phase of hypochondriasis, under the influence of which the political movements of the times seemed to him only conspiracies against religion and social order. The French revolution and the ideas propagated by it inspired him with a sort of frenzy; and for the purpose of arresting the republicanism which seemed likely to subvert all existing institutions, he addressed a memoir to the emperor Leopold II., recommending a league of the absolute governments against all revolutionists. In 1794 he was compelled by physical and mental exhaustion to give up all his occupations.—See *Zimmermann's Krankengeschichte*, by Wichmann (Hanover, 1796), and *Vie de Zimmermann*, by S. A. Tissot (Lausanne, 1797; English translation, London, 1797). His autobiography appeared at Hanover in 1791.

ZINC, or **Spelter** (symbol, Zn; chemical equivalent, 65; specific gravity, 7·03 to 7·2), a highly lustrous white metal, with a bluish gray tint. It crystallizes in forms not perfectly recognized—according to Nöggerath and Plattner in hexagonal prisms, and according to G. Rose in monometric forms also, hence probably dimorphous. On fresh fractures it presents a beautiful foliated crystalline structure. It is comparatively soft, but harder than tin, and is brittle or malleable and ductile, according to temperature, viz.: at ordinary temperatures brittle, parting along cleavage faces; between 100° and 150° C. (212° and 302° F.) malleable and ductile, so that it can be drawn into wire or beaten or rolled into plates; at 200° C. (392° F.) so brittle that it may be pulverized in a mortar having this temperature. It is fusible at 412° C. (773° F.), and volatile at high red heat. It expands rapidly when heated ($\frac{1}{333}$ of its length in passing from 0° to 100° C.), and contracts when cooled. The boiling point, according to Deville, is about 1040° C. (1904° F.); according to Becquerel, 891° C. (1636° F.). The temperature of melting also affects the brittleness. Cast at a high heat, zinc is brittle; but cast at the lowest practicable temperature, it is malleable. The cause of this appears to lie in the connection between crystalline structure and brittleness. In preparing zinc to be rolled, it is usually melted in large kettles, and before casting in warmed moulds pieces of solid zinc are thrown into the bath to reduce its temperature. The process of rolling hardens it, but it may be annealed at low heat. It is not highly tenacious; zinc wire $\frac{1}{12}$ in. in diameter sustains 25 lbs., or about two tons per square inch of section. The vapor of zinc burns in the air with a brilliant bluish white flame to flocculent white oxide (zinc white, the *nihil album, flores zinci,* or *lana philosophica* of the alchemists, and the *pompholyx* of the ancient Roman metallurgists), which is not easily fusible or volatile, but is mechanically carried by the draft attending combustion, so that its deposition in settling chambers as an almost impalpable precipitate has a superficial resemblance to sublimation and condensation. If zinc is melted and brought to glowing heat under access of air, it burns to oxide, which may be skimmed from the metallic bath. Fine turnings of zinc will burn to oxide if lighted with a match. Exposed to a moist atmosphere, the metal soon loses its lustre, acquiring a thin gray film (often called oxide, and sometimes suboxide, but more correctly a basic carbonate), which, closely adhering to it, protects it from further change. The usefulness of this property is evident. Pettenkofer found that upon a sheet of zinc which had been exposed as part of a roof for 27 years, the oxidizing action had penetrated but 0·01 millimetre. In the presence of air, zinc decomposes water, producing zincic oxide and liberating hydrogen. In this way hydrogen is made for laboratories, dilute sulphuric or hydrochloric acid being used instead of pure water, and zincic sulphate or chloride being formed, which is removed by solution from the surface of the metal, greatly assisting the rapidity and uniformity of the liberation of hydrogen. Boiling solutions of potash are also decomposed by zinc in a similar manner, the resulting zincic oxide being dissolved. Zinc is the most electro-positive of the metals, whence its use in galvanic batteries, &c.; and the presence of electro-negative metals, producing galvanic action, facilitates the reactions above described. Indeed, chemically pure zinc is with difficulty acted upon by acids in a glass vessel. The ordinary zinc of commerce is never perfectly pure, but contains various ingredients derived from its ores or from the apparatus of reduction. The purest commercial zinc is that of Pennsylvania and New Jersey, as appears from the following analyses given by Kerl:

FOREIGN SUBSTANCES.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Iron........................	0·24	0·136	0·101	0·155	0·15	traces to 0·17	0·041	0·018	0·62	1·05
Lead........................	0·3 to 2·0	2·893	1·563	1·100	0·45	0·27 to 0·91	0·503	......	0·13	0·25
Cadmium....................	traces	traces	0·282	......	....	0·16 to 0·23	0·078	......	....	....

Nos. 1 and 2, Upper Silesia; 3, Bleiberg; 4, Dombrowa; 5, Carniola; 6, Austria; 7, La Salle, Ill.; 8, Bethlehem, Lehigh co., Pa.; 9, Engis (from calamine); 10, Engis (from blende). The amount of arsenic in European zincs is said to range from 0·0005 per cent. in the best Belgian to 0·19 per cent. in the worst French. The zinc of Freiberg in Saxony contains about 0·04 per cent. of iridium; that of Johannisthal in Carinthia, 0·2 to 0·5 per cent. of sulphide of lead; that of New Jersey is doubtfully reported to contain traces of copper and tin. Manganese, antimony, and even cobalt and nickel, are also named as occurring in traces in commercial zinc. The Silesian metal derives its high percentage of iron (shown in the above table) from the kettles in which it is melted. Cadmium frequently accompanies it in its ores, as manganese does iron, replacing it to some extent in the chemical formulas of the minerals, or forming combinations isomorphous with those of zinc.—As will be inferred from the foregoing, zinc readily forms alloys, the most important of which are those with copper, or copper and nickel. Ordinary brass contains about 71·5 parts copper to 28·5 zinc; pinchbeck, 84·5 copper to 15·5 zinc. The term tombac, employed in German for pinchbeck, appears to be used at present by English writers in a different sense. According to Brande, tombac is brass with an excess of zinc; and later English authors apply the term to white copper, an alloy of copper and arsenic. There are numerous other alloys of zinc and copper, or zinc, copper, and tin, composing a great variety of oroides or imitations of gold, bronze powders, button metals, &c. German silver or argentan (originally imported from China under the name of *packfong* or white copper) is an alloy of copper, zinc, and nickel, much employed as a substitute for silver in utensils, and especially as a basis for the best silver plate (electro-plate). The general rule is said to be that copper and zinc in this alloy should bear the proportion of 8 : 3, and that the nickel should be not less than one fourth nor more than three fourths of the amount of copper. But Aubelen says that copper 3, zinc 1, and nickel 1 gives the best alloy for working, and also most nearly resembling silver; and many analyses of good English ware approach this composition. The alloy of zinc and silver plays an important part in the processes of Parkes, Cordurié, Flach, and others, for the desilverization of argentiferous lead. (See Lead, and Silver.) Apart from its alloys, zinc is used for ornamental castings (statuettes, &c.), which are to be painted, copper-plated, or bronzed. For this purpose it is adapted by its cheapness, fusibility, and property of filling the mould completely without shrinkage, giving sharply defined castings. It is also employed as sheet zinc in roofing, cornices, signs, vessels, &c.; for coating iron (see Galvanized Iron); for sheathing ships; as fuel, so to speak, in the galvanic battery; and in the preparation of hydrogen by the decomposition of water. The Döbereiner lamp, once common, but now superseded by friction matches, is a small hydrogen generator, consisting of a bell glass in which is suspended a piece of zinc, and which is placed in a jar containing very dilute sulphuric acid. The action of the acid and water upon the zinc liberates hydrogen, which, collecting in the upper part of the bell glass, drives the liquid down and out into the surrounding jar; so that when a certain quantity of the gas has accumulated the zinc is no longer in contact with the liquid, and the process ceases until, the hydrogen being drawn off, the liquid rises again under the bell, and again attacks the zinc. The hydrogen, when a light is required, is allowed to escape through a small cock at the top, and to impinge upon a ball of platinum sponge, which, condensing the gas in its pores, grows white hot, and sets the hydrogen jet on fire. For the production of pure hydrogen the zinc must be free from arsenic, traces of which are common in the commercial article. This is particularly important in Marsh's test for arsenic.—The most important compounds of zinc are the oxide, carbonate, chloride, sulphate, and acetate. The oxide, *flores zinci*, ZnO (80 parts of zinc to 20 of oxygen), a soft white or faintly yellow, tasteless, and inodorous powder, turning lemon-yellow when heated, and recovering its whiteness on cooling, has been used medicinally as a tonic and anti-spasmodic, in epilepsy, whooping cough, chorea, and various spasmodic affections, and as an exsiccant, externally applied in powder or in ointment to excoriations, slight ulcerations, &c. In the manufacture of spelter and the melting of brass, a portion of the zinc is volatilized and oxidized, the oxide settling on the walls of the furnace in a white or gray mass. The former is called by pharmacists *nihil album*, the latter *tutia Alexandrina*, though under both these names substances are now sometimes offered which consist of gypsum or other earthy minerals, without a trace of zincic oxide. The metallurgical name is furnace calamine or cadmia. The carbonate is best precipitated by pouring a hot, pure solution of the sulphate into one of sodic carbonate. It is used medicinally in fine powder, dusted externally upon excoriations, &c., as a mild astringent and exsiccant. The native carbonate, or smithsonite, formerly called calamine, one of the principal ores, is considered below. Zincic chloride, or butter of zinc, $ZnCl_2$, is prepared by heating zinc in chlorine gas, or by dissolving it in muriatic acid. In the latter case hydrogen escapes, and the chloride is left in the solution, which upon heating gives off steam, until at 250° C. (482° F.) the anhydrous salt remains. But this is still fluid, and may be heated up to 371° C. (700° F.) without great volatilization. Hence this substance is used in the laboratory as a heating bath for high temperatures. Pure zincic chloride is a white, semi-transparent, waxy substance, fusible, deliquescent, corrosive to the skin, and possessing even in weak solution a burning, nauseous, saline taste. It is employed internally as an alterative and antispasmodic (in over doses, a corrosive poison, for which the alkaline carbonates are antidotes), and externally as a caustic, by some considered superior to argentic nitrate. In concentrated solution it is an antiseptic and preservative of vegetable fibre against decay. (See Disinfectants, and Preservation of Wood.) It absorbs ammonia freely, and unites with alkaline chlorides to form double chlorides, and with ZnO to form oxychlorides. A concentrated solution of zincic ammonic chloride is used to clean the surfaces of metals before soldering, by removing the metallic oxides. A solution of zincic chloride containing iodine and potassic iodide is recommended in microscopy for giving to the cellulose of vegetable objects (for instance, to cotton) a violet or blue tint, without injury to their structure. An artificial filling for teeth ("bone filling") is made by intimately mixing one part of very fine glass powder with three parts of pulverized zincic oxide; then, in a different vessel, preparing a concentrated solution of zincic chloride, to which about 2 per cent. of hot concentrated borax solution is added. With the compound solution, the powder is moistened to a paste just before using. In a few minutes (the borax serving merely to retard the reaction somewhat) the mass "sets," by reason of the formation of oxychloride, which, together with the glass powder, presents a degree of hardness at least equal to that of marble. Zincic sulphate, or white vitriol, occurs in mine waters or as efflorescence in mines, where the sulphide (zinc blende) is among the ores. It is produced for use in the arts by calcining zinc blende in heaps, leaching, evaporating, crystallizing, &c. The commercial salt may contain sulphates of iron, copper, manganese, magnesia, or lime. Large quantities of the solution of zincic sulphate are produced in telegraph and other galvanic batteries in which dilute sulphuric acid acts upon metallic zinc. Its crystals are rhombic prisms, colorless, transparent, very soluble in water, and slightly efflorescent in the air. If prepared by slow evaporation, they are large; but when crystallized from a very concentrated solution, or stirred during the process, they appear as fine needles, like those of Epsom salts (magnesic sulphate), with which zinc vitriol is isomorphous. They have a sharp metallic taste. Ordinarily the crystallized salt contains seven equivalents of water; but crystals can be formed with only six, five, two, and one. At 100° C. (212° F.) six equivalents escape, the last equivalent going only at higher temperature. The number of parts of the sulphate dissolved by 100 parts of water at different temperatures is as follows:

Centigrade.	Fahrenheit.	Anhydrous salt.	Crystals.
10°	50°	48·36	138·21
20°	68°	53·10	161·5
30°	86°	58·50	191·0
50°	122°	68·75	263·8
100°	212°	95·60	653·6

The great increase in the solubility of the crystals at the higher temperatures is due to their melting in their own water of crystallization. Medicinally zincic sulphate is tonic, astringent; in large doses a prompt emetic; in over doses, an irritant poison, which, if not expelled by vomiting, may be counteracted with bland drinks in large quantities and the administration of opium. The solution is used externally as a styptic to bleeding surfaces, as a collyrium in diseases of the eye, as a gargle for ulcerated sore throat, and as an injection upon inner excoriated surfaces. It is used as a mordant in cotton printing, and as a dryer for oil paints. It is the substance from which numerous zinc compounds are prepared. Its property of decomposing at high temperature and leaving zincic oxide is made the basis of the preparation of the mixed zinc colors, in the various shades of which iron, manganese, cobalt, copper, nickel, and silver play a part. Zincic acetate is a medicinal preparation similar in properties and uses to the sulphate, and likewise employed as a mordant.—*History.* The ancient Greeks and Romans made brass from ores of zinc and copper, but were not familiar with metallic zinc. Strabo speaks of a metal called "false silver," obtained by calcining and then melting with a certain earth a stone found near Andeira in the Troad. This metal, melted with copper, produced *orichalcum*, apparently the brass of the ancient Romans, of which the coins of the commencement of the Christian era are composed. Some imperial Greek coins of the 2d century also contain zinc, though the Greek bronze was usually made of copper and tin, occasionally with some lead. Pliny speaks of an ore called cadmia, used in the smelting of copper (probably a mixture of the carbonates or sulphides of copper and zinc), and describes the white, flocculent sublimate (*pompholyx*, zincic oxide) and the dense incrustation (*spodos*, now called cadmia or furnace calamine) forming upon the inner furnace walls when zincose ores are smelted. Sometimes the cadmia of Pliny appears to mean either natural calamine or furnace calamine. This confusion is found in other ancient writers, and is not unnatural, considering the stony appearance of the latter product, and the circumstance that both were found to yield with copper the same alloy. Festus (writing at some time between about A. D. 100 and 400) says: *Cadmia, terra quæ in æs conjicitur, ut fiat orichalcum.* Ambrose, bishop of Milan, writes similarly in the 4th century. Beckmann cites Aristotle and Strabo concerning an ore of this nature, used for making brass, and Dioscorides and Galen as to the artificial product, which in their time was used medicinally, particularly in ophthalmic diseases. The term *tutia* (whence our tutty, as from *cadmia* our calamine), used in the 11th century by Avicenna, was similarly applied by the Greeks and Arabians to both the artificial and natural compounds rich in zincic oxide. Zosimus (a writer of the 5th century, as Beckmann supposes) prescribes the smelting of Cyprus copper and strewing of pounded tutia over it, to make brass; and the alchemist Hermes taught the use of tutia (of which he speaks as an artificial product from copper-smelting furnaces) in the transmutation of metals, for giving a gold color to copper. Yet in Germany the nature of furnace calamine seems to have been unknown or forgotten, until in the 16th century Erasmus Ebener showed that the vast quantities of it which had accumulated at the Rammelsberg furnaces might be used instead of native calamine in the manufacture of brass. The general ignorance of metallic zinc, coupled with such ancient and general use of its oxide and alloys, was due to its volatility and oxidability. It was at Goslar, near the Rammelsberg, in the Hartz, that the Dominican monk Albertus Magnus, in the 13th century, obtained the metal, which he called *marchasita aurea.* Paracelsus, who died in 1541, first described it distinctly, and called it zinc (probably from *zinke*, a nail, in allusion to its crystalline fracture). He knew of it only as produced in Carinthia. Agricola (about 1550) speaks of the Goslar zinc as *liquor candidus*, or, in German, *conterfey;* and Fabricius, who died in 1571, conjectures that *stibium* is what the miners call *cincum*, which can be melted but not hammered. The alchemists, attracted by its property of giving a golden color to copper, probably expected great things from it, and sought to keep its nature secret. As late as 1617 it appears to have been an accidental product only of the Goslar furnaces, and in great request among the alchemists. Löhneysen says a metal called zinc or *conterfeht*, resembling tin, but harder and less malleable, collected in crevices under the melting furnace, where the stones were not well plastered. A few ounces, or at most two pounds, could be obtained at one time. Henkel is named by Beckmann as the first who intentionally manufactured zinc from calamine. This was probably in 1721. By 1737 the manufacture was in successful operation in England, where it was invented by Dr. Isaac Lawson, a Scotchman. A. von Swab, of the Swedish council of mines, distilled zinc from calamine in 1742. Works were established at Bristol in 1743 by John Champion, who took out a patent in 1758 for the use of blende. His process was the *destillatio per descensum*, described below. Calamine brass had been made in Surrey a century before. The production of zinc in the East Indies is of still earlier date. As "Indian tin," or *speautre* (whence "spelter"), it was imported into Europe by the Dutch, who, it is said, captured a cargo of it from the Portuguese before 1640. It is vaguely referred to as coming from China, Bengal, Malacca, and the Malabar coast. According to Raynal, the Dutch East India company purchased annually in the latter part of the 18th century, at Palembang, 1,500,000 lbs. of zinc. The process of extracting it from its ores is said to have been brought to Europe by an Englishman, who went to India to discover the secret.—The first zinc produced in the United States was made about 1838, at the United States arsenal in Washington, from the red oxide of New Jersey, for the brass designed for standard weights and measures ordered by congress. The process proved so expensive as to discourage for a long time the idea of treating this ore. The regular manufacture was first undertaken at the works of the New Jersey zinc company in 1850. The Belgian plan, first adopted, failed by reason of the chemical action of the ore upon the retorts. The oxide of iron in the franklinite, associated with the red zinc ores, was particularly injurious, forming a fusible silicate with the silex of the clay. The Silesian plan, tried in 1856 by Matthiessen and Hegeler at the works of the Lehigh company, also proved a failure. Samuel Wetherill of Bethlehem, Pa., attempted to produce spelter by treating zinc ores in open furnaces, the oxidized vapors being drawn through incandescent anthracite to reduce the oxide. Joseph Wharton is said to have experimented on a somewhat similar plan at Camden, N. J., but the idea cannot be said to have proved practicable, though Mr. Wetherill, who obtained a patent for his process, made a few tons of zinc. He subsequently recommenced the business, using upright retorts, and succeeded in obtaining materials and devising a mixture sufficiently refractory for his purpose. This important desideratum being secured, the Lehigh zinc company, of which Mr. Wharton was manager, returned to the Belgian furnace, importing a metallurgist and skilled workmen, and finally in 1860 constructed works at Bethlehem, where it still carries on the process. Meanwhile the manufacture of zinc white, which involves less difficulty and loss, and for which the purity of the Pennsylvania and New Jersey ores and the smokeless combustion of anthracite afford the necessary conditions, was successfully carried on by both the New Jersey and Lehigh companies, according to a plan invented by Mr. Wetherill. Spelter ingots and rolled sheet zinc are now manufactured in the United States by a considerable number of establishments, enumerated below.—The chief deposits of zinc ores in Europe are in Silesia and Carinthia, and near Liége in Belgium, particularly the mine of Vieille-Montagne or Altenberg, between Liége and Aix-la-Chapelle. Spain, Sweden, Great Britain, and other countries also furnish either calamine or blende. It is said that Swedish ores are now taken to Vieille-Montagne, the deposit there being partially exhausted. The chief deposits in the United States are those of calamine and blende at Friedensville, Lehigh co., Pa., in the lower Silurian magnesian limestone, the red oxide deposits of New Jersey in the same rock, the calamine deposits near Knoxville, Tenn., and in Arkansas, the calamine and blende deposits of the Silurian rocks of S. W. Wisconsin, and the subcarboniferous rocks of S. W. Missouri.—*Metallurgy.* There are four principal ores of zinc, viz.: 1, the carbonate (smithsonite, formerly called calamine), containing when pure 52 per cent. of zinc, white or pale yellow or green, vitreous to resinous in lustre, of sp. gr. 4·2, hardness 4·5, crystals rhombohedral; 2, the silicate, which is either anhydrous (willemite), containing 58 per cent. zinc, white, gray, or pale yellow, of vitreous lustre, sp. gr. 4, hardness 5·5, crystals hexagonal; or hydrous (calamine or electric calamine), white or pale yellow, of vitreous lustre, sp. gr. 3·16 to 3·9, hardness 4·75, crystals hemihedral; 3, the sulphide (sphalerite, zinc blende), 66·9 per cent. zinc, yellow, red, brown, or black, rarely green or white, of adamantine lustre, sp. gr. 4, hardness 4, brittle, crystals isometric, containing as accidental constituents iron, cadmium, copper, manganese, antimony, and lead, in traces; 4, the oxide (zincite, red zinc ore), 80·2 per cent. zinc, deep red to orange yellow, of subadamantine lustre, sp. gr. 5·5, hardness 4, brittle, crystals hexagonal, occurring exclusively in the neighborhood of Franklin, N. J., and usually mixed with willemite, franklinite, and magnetite. To these natural ores may be added artificial zinciferous by-products, such as furnace calamine, zinc crusts from desilverizing processes, &c.—The manufacture of zinc is essentially a reduction, by means of carbon, of the zincic oxide, formed by a preliminary calcination of the ore. Since the temperature at which the oxide is reduced is about 1300° C. (2372° F.), or near the fusing point of cast iron, while the zinc melts at 412° C. and boils at 1200° C., the metal when reduced is a vapor, which by cooling is condensed into a liquid. Hence the distillation is performed in retort furnaces, which must be of the best fire-proof material. The price of fuel, its nature (giving long or short flame), the price and quality of clay, and the nature and purity of the ore, control the choice of methods and apparatus from among the three chief forms about to be described. A special difficulty in the manufacture arises from the property of the metal at nearly the temperature of its reduction to become oxidized again in the presence of carbonic acid, the formation of which cannot be entirely avoided. By heating zincic oxide and carbon, zinc and carbonic oxide are formed, the latter of which, acting upon another portion of zincic oxide, reduces it to metal and itself becomes carbonic acid. At sufficiently high temperature, this carbonic acid is again reduced to oxide by another portion of the carbon; but if the temperature falls to a certain degree below white heat, the carbonic acid is reduced by the metallic zinc vapors instead, oxidizing these in turn to zincic oxide. Hence the retorts should not be allowed to cool during distillation. In order that the zinc vapors passing out of the retorts into the nozzles or condensers may be as little as possible oxidized by air and carbonic acid there present, the latter vessels must be kept so cool (say 400° C= 752° F.) that the zinc may at once become liquid; but in spite of this, a portion is oxidized, causing loss and extra expense in the repeated reduction of the oxide. Too much cooling of the nozzles, or too slow generation of the zinc vapors, causes the formation, instead of liquid zinc, of a zinc powder, which must be transformed into bars at further expense and loss. Metals more volatile than zinc, particularly cadmium and lead, pass over chiefly at the commencement of the process, and are caught in vessels beyond the nozzles. Aqueous vapor oxidizes energetically the vapors of zinc. The operations preliminary to distillation are calcination, crushing, and the preparation of the charge. Calcination is applied to the carbonate and silicate ores to expel carbonic acid and water, and to facilitate by the disintegration of the ore the subsequent action of carbonic oxide gas. For this purpose kilns may be used, in which the ore (in fragments) is either played upon by flame, or is charged in alternate layers with the fuel. The latter method saves fuel and gives a more uniform result, but may involve a reduction and volatilization of zinc when the fuel is in excess, and also adds to the ore the impurities contained in the cinder and ashes of the fuel. For finely crushed ore reverberatories are employed. The practice, formerly common, of using the waste gases from the distilling furnaces to heat the calcining furnaces, or even, as in the old Silesian furnaces, of building chambers for calcination in the same furnace, in another part of which distillation was conducted, is now pretty generally discarded, as interfering with the proper control of the latter and more delicate operation. The roasting of zinc blende has for its special object the removal of sulphur and the formation of zincic oxide. Owing to its density, this ore must in general be reduced to grains of one to two millimetres diameter, though a preliminary calcination of fragments may be performed in open heaps or kilns; and there are a few varieties of blende (like some light-colored, massive blendes of the Rhine provinces) which, once ignited, burn of themselves, and may hence be easily roasted by the ruder method. Usually, however, even the finely crushed blende yields its sulphur with difficulty, because the sulphate which is formed decomposes at white heat only. The best practice, under ordinary circumstances, leaves 1 to 2 per cent. of sulphur in the charge, since to remove this remnant would involve a disproportionate consumption of fuel and an increased loss of zinc in roasting. The sulphur remains either in undecomposed sulphides or as sulphate. At the Lehigh works, Bethlehem, Pa., 40 per cent. of coal dust is mixed with the blende in roasting, but 1 or 2 per cent. of sulphur still remains. The chief inferiority of zinc blende as an ore to the carbonate, silicate, or red oxide lies in the greater cost of the roasting as compared with the calcination of the latter ores. About nine times as much fuel is required per unit of zinc subsequently produced. Moreover, the usually greater impurity of blende, and the higher temperature required in its treatment, cause the presence of a larger amount of metallic oxides (iron, lead, manganese, &c.), which both attack destructively the retorts and yield a final product of inferior quality. This is not the case with exceptionally pure blendes. The choice of apparatus for roasting blende is determined to some extent by the utilization of the sulphurous acid vapors. If these are to be transformed into sulphuric acid, muffle furnaces, or the inclined furnace of Hasenclever, or the upright terrace furnace of Gerstenhöfer (Stetefeldt's showering furnace has also been recommended), may be employed. The Hasenclever furnace, in its latest form, with which the name of Hilbig also is associated, is used at several European works. In the accompanying sectional sketch, *i* is the hopper into which the ore is charged; *s*, an inclined channel, depressed 43° from horizontal, 1·8 metre wide, 0·5 metre high, and 9 metres long, heated from below by the flame in the flue *d* from around the muffle furnace *b*; *h*, *h*, 50 partitions, which stop short several centimetres above the inclined floor, forcing the ore to descend in a thin layer, while the gases from the muffle, *b*, passing through openings placed zigzag in these partitions, are made to traverse the surface of the ore for a long distance, and finally allowed to escape at *s*, loaded with sulphurous acid. The inclined channel and the flues are accessible through side doors. At *g* is a hollow, air-cooled, revolving feeder, operated periodically by a water power, at each turn of which a certain amount of ore is taken from the bottom of the incline and pushed into the muffle, while the layer of ore in the incline slips downward. Every two hours the ore is spread out in the muffle by hand, through working doors, and gradually pushed to the back, where it falls through an opening upon the hearth *a*, heated by direct flame. Here it is completely roasted, the last portions of sulphurous acid escaping with the gases of combustion through *e*, *c*, *d*, and *m* into the stack. The Boëtius gas producer *l*, and the air supplied at *n*, give an economical heat to the hearth, the working door of which is at *f*. It will be seen that this arrangement keeps the flame gases, smoke, &c., separate from the charge till the roasting is nearly complete, and thus furnishes sulphurous acid gas of greater purity (escaping at *s*) for the manufacture of sulphuric acid. The gas passes from *s* first into a cooling chamber, on the iron top of which ore is dried, thus completing the utilization of the heat. Even blende poor in sulphur (which is the hardest to roast) can be successfully treated in this apparatus. A blende containing 20 per cent. of sulphur when charged was found to contain at *g* 10 per cent., at the back side of *b* 6·4 per cent., and at the fire bridge of *a* (just before withdrawal) 1·2 per cent. The further dimensions of the furnace are, in metres: muffle, *b*, 6·5 long, 1·8 wide, 0·4 high, with five working doors on one side; hearth, *a*, 5·7 long, 0·4 high; generator, *l*, 1·5 high, 0·5 broad at the bottom, 1·4 at the arch. This furnace is a good example of the modern improvement of combining the muffle and the reverberatory, neither of which is perfectly satisfactory alone, since the former furnishes usually a dilute gas for the sulphuric acid chambers, with a relatively large consumption of fuel, and effects an incomplete roasting, while the latter contaminates the sulphurous acid with flame gases and smoke. Nevertheless, the reverberatory is still largely employed, especially with two hearths disposed one over the other, or at different levels side by side, to permit the more complete utilization of heat and the gradual advance of the ore to hotter zones. Very long reverberatories are some-

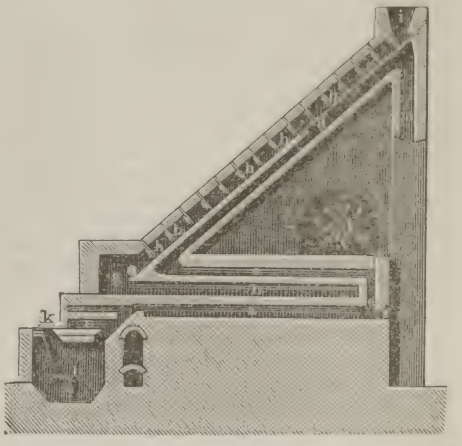


Fig. 1.—Hasenclever Furnace.

times employed for the same purpose. Blende is crushed fine before roasting; other zinc ores, which have been calcined in lumps, are crushed likewise, preliminary to distillation, finer for the Belgian than for the Silesian process. The crushing apparatus for hard ores may be rock breakers, rollers, &c.; for softer material, grinding or Chilian mills, or centrifugal pulverizers. The preparation of charges for distillation consists in mixing the calcined ore with a proper proportion (sometimes 100 per cent., but usually 40 to 46 per cent. for calamine, and 55 to 60 per cent. for blende) of lean coal, as free as may be from pyrites and slate. It is well to substitute coke for half the coal, since coke forms no water, and thus diminishes that cause of the production of zinc powder. But coke alone is said to reduce less powerfully and to require a higher temperature. The distillation of zinc from the oxidized ores is always conducted in muffles (Silesian method), retorts (Belgian method), or crucibles (old English method), and hence involves much consumption of fuel and destruction of refractory material. Great losses of metal are also unavoidable, ranging from 9 to over 30 per cent. of the zinc in the charge. All attempts to reduce the cost of distillation by employing shaft furnaces, reverberatories, or very large muffles have hitherto failed, by reason of their production of zinc powder or zincic oxide, or both, which must after all be treated in retorts, to obtain liquid zinc.—The old English method is a distillation *per descensum*, the ore being charged into crucibles placed in a circle about a central fire and under an arch. These crucibles are covered, and the zinc vapors, formed by heating, are obliged to pass down through the charge and by openings in the bottom of the crucibles, to be condensed below. The capacity of such furnaces is small, the emptying of the crucibles inconvenient, the destruction of fire clay comparatively light, and the consumption of fuel very great (22 to 27 parts of fuel for one part of zinc produced). For these reasons the process is now generally abandoned, except for the redistillation of zinc residues, in localities where fire clay is dear and coal is very cheap.—The Silesian and Belgian methods are now chiefly followed. The former employs muffles, and, according as the flame outside of the muffles is allowed to escape freely upward into the air through openings in the arch, or is conducted downward through openings in the hearth to a chimney, the process is known as the old Silesian or the Belgian-Silesian. The Belgian system employs cylindrical retorts, placed in rows, gently inclined, in the furnace. The old Silesian furnace consists of a square, arch-covered hearth, with a depressed fire box in the middle, on both sides of which muffles are arranged in rows. Such a furnace may contain 20 to 26 muffles, averaging 3 ft. 7 in. in length, about half as much in height, and a quarter as much in width. Lean coal, giving a short flame, is burned on the grate, and the flame plays around the muffles, subsequently escaping, either through openings in the arch, or through side openings into chambers for "tempering" muffles, calcining ore, or remelting zinc. The zinc vapors from the muffles escape through elbow-formed nozzles and fall, condensed into drops, into receptacles, where they congeal, to be subsequently remelted and cast into bars. The residues, withdrawn from the muffles, fall on the floor of the works, and, together with the gases and smoke escaping from the top, cause much inconvenience to the workmen. Moreover, the fuel consumption is large (17 parts to one part of zinc produced), and the total loss of zinc may reach more than 30 per cent. Charging fresh ore into the adjoining calcination chambers may cool down the distilling space injuriously, as may also the necessary poking of the coals, or opening of the furnace door to promote combustion, there being no chimney to give a draft. The addition of a chimney, on the other hand, is said to cause with certain coal, like the lean coal of Silesia, too quick a combustion; and moreover the draft causes a leakage of zinc vapors through defective places in such muffles as are nearly worn out. The muffles are made with care of fire clay and "chamotte" (coarsely pulverized old muffle material), kneaded and moulded by hand or machinery. The imperfections of this process have not prevented its continued use in Silesia, where habit and skill, coöperating with local conditions, seem to permit its employment with fair results. The charge per 24 hours for a 20-muffle furnace (apparently the best type) is 750 to 800 kilogrammes of calamine; duration of muffles, six to eight weeks. The following are the stages of the process of distillation: careful drying and heating of the furnace; introduction of the glowing muffles from the tempering chamber, and placing of them upon a bed of sand in the hearth; filling of spaces where the flame is not to pass with clay and fragments of brick; attachment of the nozzles; plastering of all cracks with loam; gradual charging with long semi-cylindrical spoons, through openings in the elbows; closing of these and other openings; accumulation for the first two or three hours of zinc powder in the cold necks or nozzles, and its removal by means of an iron wire; white heat in the furnace and an increasing production of drops of zinc for six or eight hours; maintenance for an equal period of the maximum flow; gradual diminution after 24 hours from charging; opening of the furnace, and removal of the liquid zinc to a cooler space; raking out of the residues, scraping, repairing, or replacing of muffles; fresh charge; remelting of the zinc in iron kettles. In the Belgian-Silesian method, a long flame strikes from the fire box against the arch, reverberates around the muffles back to the hearth, and is drawn through openings in the latter into a flue below, which leads either direct to the chimney or to calcining chambers.

This arrangement more completely utilizes the fuel, and reduces the consumption of coal to from six to eight parts for one part of zinc produced. The production is also increased, and the annoying smoke is removed. The long flame permits an increase of the number of muffles to 40; and by the use of gas as fuel (see below) as many as 136 have been heated successfully in a single furnace. The nozzles are made like those in the Belgian retort furnaces, so that the zinc, instead of issuing in drops, and requiring to be remelted afterward, flows at once into moulds, with less loss by oxidation. What zinc powder is formed is mostly caught in balloons attached to the extremity of the nozzles. The residues fall, when the furnace is cleaned out, through slits into ash pits, from which their vapors are conducted away through flues. A great improvement in this variety of the Silesian process has been effected by the use of gas producers instead of ordinary grates. The Siemens regenerative gas furnace has been adapted for the purpose, with the advantages of a great gain in fuel, and an increased durability of the muffles, which carries with it a diminution both in the cost of repairs and in the leakage of vapors. On the other hand, this apparatus requires large expenditure in construction, careful adjustments, and skill and faithfulness in attendance. Zinc oxide, which accumulates in the regenerators, requires to be removed. The Siemens apparatus, invaluable for metallurgical operations requiring the very highest temperatures, can be advantageously replaced in the present case by the simpler gas producer of Boëtius, shown above in connection with the Hasenclever furnace. The general operations of distillation by the Belgian-Silesian method resemble those of the old Silesian, except as to the liquid zinc, mentioned above. The following examples will show the economy of the process: 1. Furnace with ordinary grate (requiring a long-flame coal): 24 muffles; daily charge, 580 kilos of calamine, containing 50 per cent. zinc, of which 39·2 per cent. is obtained; consumption of coal for reduction, 150 kilos; for fuel, 1,808 kilos; 0·4 muffle and 2 nozzles destroyed daily. The consumption of fuel is to the product of zinc about as 8 : 1. 2. Furnace with Siemens regenerators: 72 muffles; duration of campaign, 2,798 days; daily destruction of muffles, 1·1; ore treated daily per muffle, 28·24 kilos; zinc produced, 11·18 kilos; percentage of zinc in ore, 48; of yield, about 42 per cent. (*i. e.*, a loss of about 13 per cent. of the zinc in the ore); consumption of fuel per unit of zinc, 5·34 units. 3. Furnace with Boëtius producer: 136 muffles; ores containing 50 per cent. yield 41 per cent. of zinc; proportion of fuel to zinc, 5 to 6 : 1.—The Belgian system of distillation is conducted in inclined cylindrical retorts, disposed in rows above the fireplace, and provided with fire-clay nozzles or condensers, over the outer ends of which conical tubes (balloons, caps, or "prolongs") of sheet iron are placed during the operation. The ordinary form is shown in fig. 2, which presents a section from front to rear. In this furnace the eight retorts, *a'*, of the lowest row are left empty, to serve as "protectors" and regulators of the temperature, by means of openings in them, through which the flame may be drawn at will. Above them are 61 useful retorts, *a*. A very important matter in this process is the manufacture of the retorts, which are formed from a carefully prepared mass of clay, chamotte (dried or burnt clay in sharp fragments), and water, kneaded, and after some weeks rekneaded, &c. Coke powder may be added, to give solidity, imperviousness to zinc vapors, and smooth surface. A good composition, used at Engis, is 30 raw clay, 27 chamotte, 18 coke, 15 old retort material, 10 sand. From this mass the retorts are formed either by machinery (a core being pressed into a mould filled with the material, or the clay being pressed over a mandrel, as in the manufacture of lead pipes, or massive cylinders of clay being bored out), or by hand, in various ways, the best of which, at least for some materials, appears to be the building up of the retort, like a circular tower, by winding spirally around its upper edge a succession of long rolls of plastic clay. This is the method in the Lehigh works at Bethlehem, Pa. The proper drying of the retorts requires months, the longer the better. It is performed in large heated chambers. They are highly heated just before use, and are introduced glowing into the furnace. Recently more silicious materials (up to 94 per cent. silica) have been employed in Belgium, with gain in durability and saving of cost. The stages of the distillation are as follows: The furnace is gradually heated for two days, the retorts being empty. (The material of the retorts first put in, at the beginning of a campaign, should contain no coke or anthracite, since this would burn up while the retorts were thus heated empty.) The charges are then gradually introduced by means of semi-cylindrical spoons, the nozzles being removed for this purpose. The lower rows of retorts are most heavily charged with ore. The furnace attains its full productive capacity on the 13th or 14th day. After charging, the condensers are attached, and when the zinc

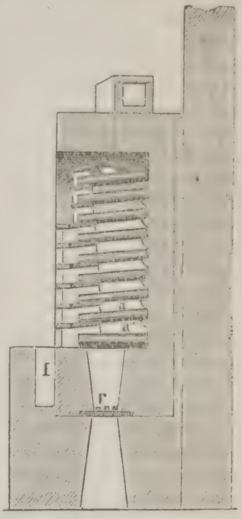


Fig. 2.—Section of Belgian Furnace.

flame makes its appearance through these, the sheet-iron prolongs are added. The liquid zinc is drawn from the condensers at intervals into ladles, skimmed, and cast into ingots. When the distillation in each retort is complete, the condenser is removed and cleaned, and the residues are scraped out of the retort. A row can be emptied in 10 to 15 minutes. The residues from the uppermost are the richest. The retort is then patched or replaced, if damaged. The destruction of the furnace ends the campaign. The following examples show the working of the process: 1. Engis. New double furnace, 92 retorts; day charge, 400 kilos ore (calamine and blende), 72 kilos rich scraps, and 166 kilos coal for reduction; night charge (the furnace being hotter), 500 kilos ore. Charging from 6 to 9.15 A. M. First tap at 1 P. M., second at 4.30, third at 6. Length of campaign, 150 to 180 days; production, 82,910 kilos zinc from 285,520 of ore, containing 40·32 per cent. zinc; loss, 11·28 per cent.; consumption for 100 kilos zinc produced, 5·8 hectolitres coal for fuel, 1·8 hectolitres coal for reduction; cost of treatment, 38·97 francs. 2. Other Belgian works. Furnaces with 70 retorts, taking 1,300 kilos of charge per 24 hours (ore containing 47 to 48 per cent. zinc), use 700 kilos of coal for reduction and 2,000 as fuel, and produce 470 to 480 kilos of zinc; say 18 per cent. gross loss, which is reduced by subsequent treatment of the residues. New furnaces with 164 retorts produce in 24 hours 1,050 kilos of zinc with 4,000 kilos of fuel. Furnaces which are heated with gas producers yield the same quantity of zinc with 3,000 kilos of fuel. As compared with the Silesian process, the Belgian requires less fuel, but a longer flame, owing to the greater distance of the retorts from the fire; a larger quantity and more refractory quality of clay; a finely crushed charge; richer ores, on account of the expense for fuel and clay; and greater skill and endurance of workmen. On the other hand, it furnishes a more rapid and complete extraction.—The mines worked by the Lehigh zinc company are in Lehigh co., Pa., in a valley from two to three miles broad, and four miles south of Bethlehem. The north and south boundaries of the valley are syenitic hills, and between these a dolomitic limestone, underlaid by slate, Potsdam sandstone, and syenite, in downward order, is the outcropping rock. In this limestone the zinc deposits occur, in nearly vertical bodies, along an anticlinal axis. They comprise a massive light-colored blende of waxy lustre, and smithsonite and calamine, in pure, earthy, and argillaceous varieties, up to a compact, unctuous clay, containing from 26 to 32 per cent. of zinc. The first discovery was made by Prof. W. T. Roepper in 1845, and the property was bought by the present company in 1861, since when it has been regularly worked. About 20,000 tons of ore are extracted annually. The chief difficulty of mining is the large quantity of water, which flows underground in rivers into the mines, all the wells and surface streams of the neighborhood having been drained. At intervals since 1854 pumping engines of increased power have been erected, until in 1871 the climax was reached with the largest mine-pumping engine in the world, the diameter of the steam cylinder being 110 in. and the stroke 10 ft., the power at 60 lbs. steam 3,000 horse power, and the ordinary capacity at considerably lower pressure 17,000 gallons of water lifted per minute from a depth of 300 ft. The mechanical and metallurgical treatment of the ore is described in a paper in vol. i. of the "Transactions of the American Institute of Mining Engineers." The following is a brief outline. The blende is crushed in a Blake's crusher, and passed over a sieve with one mesh to the inch. The larger pieces, passing over the sieve, are separated by hand from gangue, and sent directly to the furnaces, or roasted in heaps of 50 tons. The silicates and carbonates are washed and sized, and the larger pieces sent to the furnaces, the fine stuff being concentrated in buddles or jigs. For the manufacture of spelter, the heap-roasted and also the screened blende are thoroughly roasted in reverberatories, with the addition of 40 per cent. of coal dust. The silicates and carbonates are calcined in kilns, and then crushed with 40 per cent. of coal and sifted, before charging into the retorts. The ordinary Belgian process of distillation is employed. Each furnace contains 56 retorts, in seven rows, besides a bottom row of six protectors or "cannons," which are not charged. The retorts are 42 in. long, 9 in. exterior and 6 in. interior diameter, made of a mixture of fresh fire clay and ground fragments of old retorts, and provided with condensers or nozzles, 16 in. long, 6 in. diameter at the largest and 3 in. at the smallest end. The furnaces are in groups of four, with internal walls of fire brick and external of common brick lined with fire brick. The slant of the retorts varies with the quality of the ore, but is generally from 3 to 6 in. from the rear to the front. Of the mixture of ore (47 per cent. zinc) and coal 40 lbs. is charged every 12 hours into each retort, except the upper row, which are charged every 24 hours with skimmings, &c., containing from 60 to 65 per cent. of zinc. As soon as zinc vapors are seen burning at the ends of the condensers, prolongs or conical caps of sheet iron are put on. Every 12 hours the zinc is collected in ladles and poured into ingot moulds, 7 by 24 by 1 in., containing 40 to 45 lbs. The chemical reactions are described as follows. The air introduced with the charge causes an imperfect combustion of a portion of the carbon present, forming carbonic oxide, which reduces oxide of zinc to a metallic state, and forms carbonic acid. There are then present in the retort, at a high temperature, oxide of zinc, carbon, and carbonic oxide. By the reduction of two equivalents of the former, one equivalent of carbonic oxide is converted into carbonic acid, and one of carbon into carbonic oxide; and so the process continues, repeating itself until the zinc oxide has been completely reduced. Carbonate and silicate ores, containing 47 per cent. of zinc, yield actually from 34 to 35 per cent.; blende of the same richness yields 33 to 34 per cent., its smaller yield being due to the proportion of sulphur left in it, even after careful roasting. The spelter works deliver about 65 cwt. daily to the rolling mill, where it is remelted in a reverberatory and run into shallow moulds. Rolled down to the desired thickness, and annealed and trimmed, the sheets are packed in casks, containing 1,200 lbs. each. The same company manufactures zinc white. Its product since 1863 has been 47,191,829 lbs. of oxide and 34,983,717 lbs. of spelter; in 1875 it was 1,988,600 lbs. of oxide and 3,370,641 lbs. of spelter. The New Jersey zinc company, having mines near Franklin, N. J., both of calamine and of red zinc ore, manufactures at its works in Newark oxide, spelter, and (from the residues of the zinc manufacture) franklinite iron and spiegeleisen. (See FRANKLINITE.) The product of oxide and spelter by this company has been in 24 years, from January, 1852, to the end of 1875, 61,480 tons (of 2,000 lbs.) of oxide, and in 12 years, from May 17, 1864, to the end of 1875, 5,980 tons of spelter. The mines of this company are the most extensive and valuable zinc mines in the country, presenting a vein of great size and length, filled with massive ore (silicates, red oxide, and franklinite). The Passaic zinc company (mines at Ogdensburg, N. J., works at Communipaw, near Jersey City) began operations in 1855. The company works two veins, respectively 40 and 20 ft. wide, by open pits and cuts (present maximum depth, 180 ft.), extracting 5,000 or 6,000 tons of silicate and oxide per annum. The (Belgian) spelter furnaces are in two stacks of four each, back to back, 70 retorts in each furnace. There are also about 50 furnaces for making zinc white; and a rolling mill for sheet zinc was finished in 1876. The total product of oxide since 1855 has been between 30,000 and 35,000 tons, of which two thirds was produced within the last ten years. The spelter manufacture was begun in October, 1874, and about 900 tons had been produced down to the end of 1875. The best spelter of this company is exceedingly pure. The ores yield 36 per cent., which is said to be about 85 per cent. of the total quantity of zinc contained in them. The Bergen Port zinc company, at Bergen Port, N. J., manufactures spelter and oxide, employing for the former the Lehigh ore, from a mine adjoining that of the Lehigh zinc company at Friedensville, Pa. The product in 1875 was 500 tons of spelter and 1,000 tons of oxide.—An important centre of zinc production in the United States is La Salle, Ill., where several establishments treat the ores (both blende and calamine) of the Mississippi valley, which are brought to this point on account of the availability of cheap coal. The most important works are those of the Matthiessen and Hegeler zinc company, which were first established in 1857, the earliest west of the Alleghanies, except an unsuccessful furnace at Mineral Point, Wis. This company manufactures spelter and sheet zinc, in gas furnaces built after a special design of the proprietors, and strictly neither Silesian nor Belgian in principle. The product in 1874 was 8,108,062 lbs. of spelter; in 1875, 7,845,992 lbs. of spelter (7,412,132 lbs. of sheet zinc, principally made from the spelter produced at the works). In 1867 the product was a little over 2,000,000 lbs. of spelter (sheet zinc, about 2,000 lbs.). It has steadily increased since. The La Salle (formerly the Mineral Point) zinc company has six Belgian furnaces, containing 82 to 96 retorts each, and a rolling mill started in October, 1875. The works of Robert Lanyon and co., at La Salle, comprise four Belgian furnaces; those of the Illinois zinc company, at Peru, near La Salle, have the same capacity. The ores employed by all these works are chiefly carbonate and blende, associated with lead ore (principally galena), iron pyrites, and iron oxides, from S. W. Wisconsin. Blende and carbonate, and, by the Illinois company in particular, hydrous silicate, are also brought from Missouri. The Chicago zinc and mining company, at Cherokee, Kansas, has four Belgian furnaces, of 102 retorts each. The mines are in Newton co., Missouri, and yield blende containing 50 to 60 per cent., and silicate containing 30 to 40 per cent. of zinc. The works began running about the beginning of 1874, and have produced annually about 2,000,000 lbs. of spelter. The Martindale, Missouri, and Carondelet companies, at St. Louis, complete the list of the producing works of the United States. There are some establishments which buy spelter for the manufacture of sheet zinc. None of the western works manufacture zinc white, this being produced from the purer ores of the east.—The manufacture of metallic zinc in the United States is shown by the following table, compiled by Messrs. Behr and Steiner of New York from the returns of the various works. The figures given include the amount of metal rolled into sheets.

PRODUCT OF METALLIC ZINC IN THE UNITED STATES IN 1875, IN TONS OF 2,240 LBS.

WORKS.	Locality.	Product.
New Jersey zinc co.	Newark, N. J.	625
Passaic zinc co.	Communipaw, N. J.	700
Bergen Port zinc co	Bergen Port, N. J.	812
Lehigh zinc co.	Bethlehem, Pa.	1,505
Bamford brothers	Near Lancaster, Pa.	54
Matthiessen and Hegeler zinc co.	La Salle, Ill.	3,500
La Salle zinc co.	La Salle, Ill.	1,329
Robert Lanyon and co.	La Salle, Ill.	331
Illinois zinc co	Peru, Ill.	1,350
Martindale zinc co.	St. Louis, Mo.	1,820
Missouri zinc co.	St. Louis, Mo.	1,285
Carondelet zinc co.	St. Louis, Mo.	950
Chicago zinc and mining co	Cherokee, Kansas.	1,056
Total		14,817

The importations of Silesian spelter, which have averaged 3,400 tons per annum since 1862, amounted in 1875 to only 540 tons. The total annual product of zinc in Europe is over 150,000 tons, of which about half is produced in the German empire.—*Zinc White.* The use of zinc oxide as a substitute for white lead was first suggested by Courtois, a manufacturer of Dijon, near the close of the last century. M. Leclaire, a house painter of Paris, some years later devised a cheap method of producing it, by heating zinc in retorts and exposing the escaping vapors to a current of air, drawn by a chimney or exhausting fan through the condensing apparatus. He also prepared a drying oil suitable for its use, by boiling linseed oil with about 5 per cent. of oxide of manganese, and furthermore substituted new yellow and green unchangeable pigments for the poisonous ones containing lead, copper, or arsenic. The chief excellence of zinc white is its brilliant lustre and its freedom from discoloration when exposed to sulphuretted vapors, which turn lead paint black. Magnesia, or a mixture of the chloride and sulphate of zinc in small proportions, may be boiled in linseed oil, instead of manganese, to form a suitable drying oil. The Europeans still employ metallic zinc for this manufacture, and by selecting the purest spelter make the best varieties of zinc white. Such is the *blanc de neige* or "snow white" of the French, used by painters instead of "silver white." The ordinary zinc white, and "stone gray" and "gray oxide" of the English, are less pure. Stone gray is used as a ground color for walls, iron work, &c., and gray oxide for painting ships and as a ground color on stone or cement. The manufacture of zinc white from natural oxide or oxidized ores can only be practised with pure materials and a smokeless fuel. The following outline of the process as carried on at the Lehigh works, Bethlehem, Pa., will suffice as an example. The ores used for this purpose (20 per cent. zinc) are mixed with 50 per cent. pea or dust coal, rolled, and screened; and the fine and coarse ores are treated separately though similarly. The furnaces are single or double reverberatories, in which the charge is placed on heavy rolled-iron grates, with perforations for the passage of air. The charge is, for the single furnaces (5 ft. by 3), 240 lbs. of ore, 120 lbs. of anthracite, and 100 lbs. of pea coal as a bed; for the double ores (16 ft. by 5), 640 lbs. of ore, 320 lbs. of coal, 240 lbs. of pea coal. No fluxes are added, the object being to keep the charge from becoming impervious to the blast, which is furnished by four fan blowers. The process lasts four hours for each charge. A workman tends four furnaces, cleaning and charging one each hour. The chemical reactions give a curious instance of the performance of reduction and oxidation in the same furnace at the same time. The blast first oxidizes the lowest coal to carbonic acid, which, passing upward through the bed of coal, is reduced to carbonic oxide. This reduces the zincic oxide of the ore to metallic zinc, becoming itself carbonic acid again. The zinc volatilizes at the high temperature resulting; and its heated vapors, uniting with the carbonic acid, are again oxidized. The oxide thus formed is carried along a conducting channel over a sheet of water into a cooling tower, 75 ft. high and 80 ft. in circumference at the base. Much of the damp, impure oxide settles in this tower; the remainder is conveyed down another tower, 50 ft. high, and by an exhaust fan is forced through another channel, or cooling chamber floored with sheet zinc, on which another portion of impure oxide collects. The remainder is carried forward by the draft into the bag room, where a large number of muslin bags, 30 ft. long, are suspended vertically from the sheet-iron tubes conveying the oxide. Through these bags the air and gases of the draft leak out, while the flocculent zinc-white powder is retained. The bags are shaken every four hours, and the oxide is removed. By a similar method the red oxide ores of New Jersey are manufactured into zinc white; and a few years ago a considerable amount of so-called Bartlett oxide, containing both zinc and lead, and highly recommended for paint, was manufactured from the ore of a mine in North Carolina, which consisted of an intimate mixture of galena and zinc blende, in fortunately suitable proportions. The mine is at present idle (1876), and the product, under that name, is no longer in market; but it is said that galena is now sometimes mixed with zinc ores, to produce an oxide superior to white lead for vulcanizing rubber and for painting surfaces exposed to the weather. Zinc white is often mixed with barytes or white lead; and besides its use as paint, it has been applied as a mastic for metallic joints, as glazing for pottery, as enamel for papers and cardboards in place of lead or barium carbonate, and as an ingredient in artificial gems and glass instead of lead or other metallic oxides.

ZINGARELLI, Nicolò, an Italian composer, born in Rome, April 4, 1752, died in Naples, May 5, 1837. He composed the opera of *Montezuma* in 1781, followed by numerous other operas for Italian theatres, and produced his *Antigone* unsuccessfully in Paris in 1789. He became musical director of the chapel of the Vatican in 1804, in 1813 director of the new conservatory in Naples, and in 1816 musical director at the cathedral. He composed about 16 operas, besides many cantatas and oratorios, and a variety of church music.

ZINGIS KHAN. See GENGHIS KHAN.

ZINNIA (named after J. G. Zinn, a German botanist), a genus of plants of the composite family, of which there are about 12 species, belonging to the Mexican flora, though some occur along our southern boundary, and a few are sufficiently ornamental to be popular garden plants. They are mostly annuals, with opposite, sessile, entire leaves, and the numerous branches each terminated by a solitary head of flowers; the several rays are persistent, becoming dry and papery, in the centre of which is a conical, prominent disk, which in the normal state is crowded with small tubular florets. The best known species is *Z. elegans*, introduced into cultivation late in the last century; it forms a much-branching plant, and as formerly cultivated its branches were terminated by a rather coarse but showy flower (properly head of flowers), 2 to 3 in. across, with rays varying from white through red and yellow to deep purple and orange; but as it began to ripen seeds it became unsightly from the dull color of its growing and very conspicuous disk. About a dozen years ago double-flowered varieties were obtained, in which the disk produced ray or broad and showy florets, making an improvement quite as striking as any in floriculture, and the plant, which in its single state was barely tolerated, is now highly prized; its flowers, thoroughly double, present much the appearance of those of a well formed small dahlia, with a similar range of colors and shades; they are capable of producing brilliant effects when planted in masses, affording a profusion of bloom, which is continued all summer. Among other species sometimes cultivated are *Z. multiflora*, with red-purple rays, and *Z. angustifolia*, which appears in the catalogues as *Z. aurea* and *Z. Mexicana*, and its double form as *Z. Haageana;* the latter is a widely spreading and much-branched plant, with small heads of orange-yellow flowers, which in the double ones are very showy. All are readily raised from seed, and succeed in any garden soil.

Plant of Double Zinnia (Zinnia elegans).

Double Zinnia (Zinnia elegans).

Single Zinnia (Zinnia elegans).

ZINZENDORF, Nikolaus Ludwig, count, a bishop of the Moravians, born in Dresden, May 26, 1700, died at Herrnhut, May 9, 1760. His father, a Saxon minister of state, died when the son was very young, and the latter was brought up by his grandmother, the baroness Gersdorf, an earnest disciple of Spener, who was also the young count's godfather. At the age of ten he was sent to the *pædagogium* at Halle, then under the celebrated Francke, where his former religious impressions developed into enthusiasm. He was removed by his uncle on this account to the university of Wittenberg in 1716, but his feelings remained unchanged; and in addition to his other studies he applied himself to theology. In 1719 he left Wittenberg and travelled through Holland and France, and subsequently described his tour in a work entitled "Pilgrimage of Atticus through the World." In 1721 he entered the electoral civil service at Dresden, but he was still much occupied with theological inquiries and devout exercises. In 1722 he married the countess Reuss von Ebersdorf, and in the same year gave a refuge on his estate of Berthelsdorf in Upper Lusatia to a few Moravian families who had fled from persecution in their own country. The settlement rapidly increased, and received the name of Herrnhut. As these settlers were not agreed in their opinions, Zinzendorf endeavored to establish a union among them on the fundamental truths of Protestantism, formed statutes for their government, and was finally received into their congregation. He now conceived the plan of transforming the ancient Moravian church into an especial organization for propagating practical Christianity. To this end in 1734 he went under an assumed name to Stralsund, passed an examination as a theological candidate, and preached for the first time in the city church; and the same year he was ordained at Tübingen. He then travelled into different countries to extend his society, and many congregations and missions were founded. In 1736, on account of his religious innovations, he was banished from Saxony, and went to Berlin. While here he was consecrated a bishop of the Moravian church. (See MORAVIANS.) In 1739 he published a kind of catechism entitled "The Good Word of the Lord," and the same year made a voyage to the islands of St. Thomas and Santa Cruz, where the Brethren had already established missions. In 1741, accompanied by his young daughter Benigna, he began preaching at Germantown and Bethlehem, Pa., and in February, 1742, he ordained at Oly the missionaries Rauch and Rüttner. At Shekomeco he established the first Indian Moravian congregation in America. He returned to Europe in 1743, and made a journey to Livonia; but the Russian government would not allow him to proceed further. He then made several visits to Holland and England, where he spent more than four years, and obtained an act of parliament for the protection of his followers throughout the British dominions. He also established a Moravian academy, and obtained a committee of investigation into the principles of the sect, which declared the Moravian community true adherents to the Confession of Augsburg. The number of his followers increased, and new missions were established in the East Indies and other remote regions. He spent his latter years at Herrnhut, where he died after an illness of a few days. His remains were borne to the grave by 32 preachers and missionaries, whom he had reared, from Holland, England, Ireland, North America, and Greenland. Zinzendorf wrote controversial works, narratives of his own labors, numerous hymns, &c.—See Spangenberg, *Leben des Grafen von Zinzendorf* (Barby, 1772–'5; translated by S. Jackson, 8vo, London, 1838); Varnhagen von Ense, *Leben des Grafen von Zinzendorf*, in his *Denkmale* (Berlin, 1830); and R. Ritter, "Notices of Count Zinzendorf" (8vo, Philadelphia, 1857).—His son, Count CHRISTIAN RENATUS, was educated at the university of Jena, and in 1744 was introduced by his father as an elder of the single brethren. He wrote many practical soliloquies, meditations, and hymns, and died at Westminster, May 28, 1752.

ZION, or **Sion** (Heb. *Tziyon*), **Mount**, one of the hills on which Jerusalem is built. It occupies the whole S. W. section of the ancient site of the city, rising abruptly from the valley of Hinnom on the west and south about 150 ft., and above the valley of Jehoshaphat on the east about 300 ft. On the southeast it slopes steeply in a series of cultivated terraces to the site of the "king's gardens," the whole declivity being sown with grain and dotted with olive trees. On the east, overlooking the Tyropœon valley, are precipices which were anciently much higher than now. To the north alone was the site anciently unprotected by nature, and here it was strongly fortified with towers by the Jebusites. The Tyropœon separated Zion from Acra on the north, Moriah on the northeast, and Ophel on the east. (See JERUSALEM.) Mount Zion is supposed to have been the first spot in Jerusalem occupied by buildings, and to be the Salem of Melchisedek. It was captured from the Jebusites by King David, who made it the seat of his court and the depository of the ark. Hence it is frequently called in Scripture the "city of David" and the "holy hill." Its name often represents the whole of Jerusalem. Josephus calls it the "upper city," adding that it was known also in his day as the "upper market." A large part of it is outside the modern walls. Among the very recent discoveries from the excavations made by Henry Maudsley, are a portion of the old west wall of the city and the remains of an ancient tower about 25 ft. square, believed to indicate the S. W. angle of the first wall. Connected with this tower is a rock scarp averaging about 20 ft. in height, which has been traced a considerable distance northerly and easterly. At the tower and along the line of the scarp are many cisterns. All these, with a great causeway previously discovered by Capt. Warren, connecting Mount Zion with Mount Moriah, have a covering of soil and debris of great depth, at some points 50 ft. For these and other recent discoveries in detail, see "Freemasonry in the Holy Land" (New York, 1873), and the Palestine exploration fund society's "Quarterly Statement" for January and April, 1875 (London).

ZIPS (Hun. *Szepes*), a N. county of Hungary, in the Cis-Tibiscan circle, bordering on the counties of Sáros, Abauj, Torna, Gömör, and Liptó, and on Galicia; area, 1,404 sq. m.; pop. in 1870, 175,061, chiefly Slovaks and Germans. It is traversed by the highest part of the Carpathian mountains, and has large forests. The climate is inclement. The chief products are barley, oats, peas, and potatoes. There is considerable industry. Capital, Leutschau.

ZIRCONIUM (named from the mineral zircon), a rare metal, recognized as a peculiar substance by Klaproth in 1789, and first separated by Berzelius in 1824. It is a component of the minerals zircon, hyacinth, eudialyte, polymignite, oerstedite, fergusonite, and catapleiite. The double fluoride of potassium and zirconium being heated with potassium, and the residue when cold treated with dilute hydrochloric acid, the amorphous zirconium falls as a black powder. It is purified by washing with chloride of ammonium, and then with alcohol. Under the burnisher it takes a slight metallic lustre, and its conducting power for electricity is very low. Crystallized zirconium was prepared by Troost in 1865 by heating 1 part of the double fluoride of potassium and zirconium with 1½ part of aluminum in a plumbago crucible to the point of fusion of iron. After the operation the aluminum is found to be covered with crystalline laminæ, which may be separated by dissolving the aluminum in hydrochloric acid. Thus obtained, zirconium is very hard, and resembles antimony in color, lustre, and brittleness. It is readily dissolved in nitromuriatic and hydrofluoric acid; other acids have little effect. Its specific gravity is 4·15, symbol Zr, and atomic weight 89·6. There is one oxide, ZrO_2, which acts both as a base and as an acid. Its hydrate gelatinizes, and dissolves readily in acids. The salts of zirconia have an astringent taste; they are precipitated by the caustic alkalies, and not redissolved in excess of these. Infusion of galls gives a yellow precipitate with them, phosphate of soda a white one. The mineral zircon ranks among precious stones, its varieties in appearance being brown, red, yellow, gray, white, adamantine, and translucent. A variety of zircon, called jargon, exhibits in its natural state and when fused with borax a remarkable spectrum, which was supposed by Sorby to indicate the presence of a new element, for which he proposed the name of jargonium. Subsequent research convinced him that the lines in the spectrum were due to the presence of uranic oxide, whence he concludes that the supposed jargonium has no existence. Zirconia has been employed as a substitute for lime or magnesia in oxyhydrogen illumination. It is very refractory, and possesses great radiating power. To avoid expense, only the tip of the cylinder is made of zirconia.

ZISKA, or **Zizka, John,** the military leader of the Hussites, born near the castle of Trocznow, in the circle of Budweis in Bohemia, about 1360, died at Przibislaw, Oct. 12, 1424. He was of a noble Bohemian family, and in his boyhood lost an eye. At the age of 12 he became a page at the court of Prague, and subsequently chamberlain. He accompanied the body of volunteers which went from Bohemia and Hungary to join the knights of the Teutonic order in the war against the Lithuanians and the Poles, and was at the battle of Tannenberg on July 15, 1410, where the knights suffered a terrible defeat. He afterward served against the Turks in Hungary, then entered the English army, and took part in the battle of Agincourt in 1415. After this he returned to the Bohemian court. He had early embraced the doctrines of the Hussites, and entered deeply into the feelings of resentment which the execution of Huss and Jerome of Prague excited throughout Bohemia. King Wenceslas, observing his perturbation and inquiring its cause, is reported to have said to him: "If thou canst devise any means, go and avenge thy countrymen; thou hast our free permission." His hatred of the Roman Catholic clergy was intensified by a private wrong; for his favorite sister had been seduced by a monk. He soon gained the confidence of the people, and joined the party under Nicholas of Hussinetz, who took up arms ostensibly to protect the person of their king. The weak and perplexed Wenceslas demanded that they should give up their weapons; but he was too imbecile to protect the followers of the new religion, and the disputes between the Roman Catholics and the Hussites waxed fiercer and fiercer. On July 30, 1419, as a procession of priests of the latter was marching to St. Stephen's church, one of them was struck by a stone which came from the town house, where the magistrates, who were Roman Catholics, were assembled. Ziska and his adherents immediately stormed the building, and threw 13 of the city council into the courtyard below, where they were instantly massacred by the mob. This was the signal for the breaking out of the Hussite war. Wenceslas, a fortnight later, died in a tumult of passion, leaving Bohemia without a ruler and sundered by intestine war. For a time everything was in commotion. Churches were pillaged by the enraged Hussites, convents burned, and altars overturned; and Prague was besieged by the Hussite leaders, Ziska and Nicholas of Hussinetz. A suspension of arms was finally concluded, general liberty of conscience was granted, and Ziska retired with his followers and fortified himself in Pilsen. Sigismund, emperor of Germany and king of Hungary, brother of Wenceslas, was the next heir to the Bohemian throne, and toward the close of 1419 held a meeting of the nobles of Bohemia and Moravia, and of the deputies of the cities, in which he ordered the deputies from Prague to destroy the barricades in the streets and the fortifications against the castle. He also removed all Hussites from office, and repairing to Breslau proclaimed a crusade against them. The spirit of the members of the new religion was now roused to fanaticism. A solemn league was formed at Pilsen, in which the confederates, in expectation of the speedy coming of Christ, bound themselves to reject Sigismund as king, and to oppose any sovereign who did not admit the claims of the laity to the participation of the cup in the holy sacrament. Ziska formed his headquarters on the top of a steep mountain in southern Bohemia, which received the name of Mount Tabor. As vast numbers fled thither for safety, he erected walls for the defence of the place, and this fortress has been considered the first essay in the modern style of fortification. From the name of this mountain his followers were called Taborites, while the more moderate Hussites were known as Calixtines. The first exploit of Ziska was the conquest of Prague, with the exception of the castle; and in order to defend the city against Sigismund, who was approaching at the head of a vast army, he intrenched himself on the hill of Witkow, and there on July 14, 1420, with only 4,000 men, repeatedly drove back the enemy with great loss. The place is still called Ziska's hill. The emperor was finally obliged to conclude a temporary armistice with the citizens of Prague, and to grant general liberty of conscience. In

1421 Ziska took the castle of Prague, and with it gained possession of four cannon, the first that were introduced into Bohemia. During the same year he lost the sight of his remaining eye by an arrow, while besieging the castle of Raby. This however did not interfere with his activity or his generalship. He was carried in a car at the head of his troops, and was enabled to give orders for their disposition from the description of the ground given him by his officers, and from his own minute knowledge of the country. About the close of 1421 Sigismund led a second large army into Bohemia, which included a splendid body of 15,000 Hungarian horse. A battle took place at Deutsch-Brod in January, 1422, in which the imperial army was totally routed. Followed closely by Ziska in their retreat to Moravia, the fleeing troops, in crossing the Iglawa on the ice, broke through and 2,000 were drowned. He repeatedly vanquished the citizens of Prague, who were not disposed to obey his orders, and the uniform success of his arms at last convinced Sigismund that there was no prospect of the reduction of Bohemia. The emperor therefore made proposals to the blind general, offering full religious liberty to the Hussites, and the post of governor of Bohemia to himself, with numerous privileges. Ziska, who saw with much anxiety the dissensions prevailing among the Hussites, was not averse to a settlement; but before negotiations were concluded he was taken ill while engaged in the siege of Przibislaw, and died. Ziska was victor in more than 100 engagements, and won 13 pitched battles. Once only, at Kremsir in Moravia, he suffered a reverse; and even then all the evil consequences were warded off by the skilful manner in which he conducted his retreat. The great stain upon his character was his cruelty. He considered himself the chosen instrument of the Lord to visit his wrath upon the nations, and a fanaticism which asked no mercy for its defenders gave none to its opposers. His line of march could be traced through a country laid waste with fire and sword, and over the ruins of plundered towns. One of the dogmas held by his followers was, "that when all the cities of the earth should be burned down and reduced to the number of five, then would come the new kingdom of the Lord; therefore it was now the time of vengeance, and God was a God of wrath." The cries and groans of the monks and priests whom he sent to the stake he was wont to call the bridal song of his sister. His victories were generally won by the decisive charge of a chosen band of his followers named the invincible brethren. Ziska was buried in the church of Czaslau, and over his tomb his iron battle axe, his favorite weapon, was suspended. In 1623 the tomb was overthrown by an imperial order, and the bones of Ziska were removed. A common story that he ordered his body to be left to the dogs and kites, and that his skin should be used as a drum, and that it was so used by the Hussites in their subsequent wars, is a fable.

ZITTAU, a town of the kingdom of Saxony, on the left bank of the Mandau, 26 m. S. E. of Bautzen; pop. in 1871, 17,869. It has the most beautiful town hall in Saxony, with a library of 30,000 volumes, and manufactories of cotton and woollen cloths and pianos, extensive bleaching grounds, iron works, and potteries. More than 1,000 persons are employed in the adjacent coal mines.

ZNAYM, a city of Moravia, capital of a circle of the same name, and formerly of the province, 47 m. N. N. W. of Vienna; pop. in 1870, 10,600. It contains a gymnasium and a military academy of engineers. The church of St. Nicholas, built in the 14th century, and the town hall are among the most important buildings. The town has considerable trade, chiefly in produce. Marmont here defeated the rear guard of the archduke Charles, retreating from Wagram, July 11, 1809, and the armistice followed by the treaty of Schönbrunn was concluded here on July 12.

ZOAR, a village of Lawrence township, Tuscarawas co., Ohio, on the left bank of Tuscarawas river and the Ohio canal, 2½ m. N. of the Tuscarawas branch of the Cleveland and Pittsburgh railroad, 90 m. E. N. E. of Columbus, and 65 m. S. by E. of Cleveland; pop. in 1870, 326. The village was settled in 1817 by a community of German immigrants from Würtemberg, under the principal leadership of Joseph M. Bimeler (originally Bäumeler), who died in 1853. They were incorporated in 1833, under the title of "The Society of Separatists of Zoar, O.," and are commercially known as the Zoar society. The system of the society is based on a community of property, with a board of three trustees for its commercial management, and a special committee of five members for its central (interior) government, elected by ballot annually. The tract of land now held is about 7,300 acres. The village is pleasantly situated on a moderately inclined plane, and contains a meeting house, a good school building and well conducted school, a public garden with greenhouse, a general store, a commodious hotel, a woollen factory, tannery, planing works, tin, wagon, blacksmith, cabinet, carpenter, and saddlery shops, bakery, dairy, &c. The principal business of the society is general farming, with raising and breeding of live stock.—See "The Communistic Societies of the United States," by Charles Nordhoff (New York, 1875).

ZODIAC, an imaginary belt in the heavens, extending 9° N. and 9° S. of the ecliptic, within which the motions of the sun, moon, and principal planets are confined. It was divided by the ancients into 12 parts of 30° each, designated and indicated by arbitrary signs as follows: Aries, the Ram, ♈; Taurus, the Bull, ♉; Gemini, the Twins, ♊; Cancer, the Crab, ♋; Leo, the Lion, ♌; Virgo, the Virgin, ♍; Libra, the Scales, ♎; Scorpio, the Scorpion,

♏; Sagittarius, the Archer, ♐; Capricornus, the Sea Goat, ♑; Aquarius, the Water-Bearer, ♒; and Pisces, the Fishes, ♓. These names were given from a fanciful resemblance to the objects designated which was supposed to be presented by the configuration of the stars. This division is still employed. The width of the zodiac was originally determined by the widest range of planetary motion N. and S. of the ecliptic, for Venus is at times nearly 9° N. of the ecliptic and at times nearly 9° S. of that circle. If the motions of the planets between Mars and Jupiter were considered, the zodiac would have to be nearly 70° wide instead of 18°, and would cover much more than half of the celestial sphere.

ZODIACAL LIGHT, a triangular track of light, seen within the tropics, after sunset and before sunrise, stretching up from the horizon 50° or more according to the season, its axis nearly or quite corresponding with the ecliptic. It is of a warm, yellowish tint, its light stronger at the central parts, and diffused toward the boundaries. In higher latitudes it is visible under favorable circumstances during spring and autumn. It is most conspicuous when the ecliptic makes the greatest angle with the spectator's horizon, at which time in moderate latitudes it reaches nearly to the zenith, having near the horizon a striking brilliancy, and thence fading upward. Near the equator it often has at the horizon a brilliancy equal to the sky in the east as the sun is about to rise. —The few ancient records of this phenomenon are unsatisfactory. Pliny has been thought to allude to it under the name of *trabes*, though Humboldt dissents from this supposition. Kepler described it, and supposed it to be the atmosphere of the sun. Dominique Cassini began to notice it in 1683, and during 11 years accumulated a greater mass of observations than all others together up to those of Piazzi Smyth at Cape Town in 1845, and later at Teneriffe, and of Jones in 1853–'5. Cassini, finding, as he supposed, that the northern edge of the light bent away more and more from the ecliptic during March and April, when the sun's equator was similarly increasing its inclination to the ecliptic, concluded the cause to be a solar emanation; and this opinion has biassed and misled astronomers ever since. He assigned to this emanation a lenticular shape, having in June a diameter equal to that of the sun, and in March twice as great. Cassini gave to the phenomenon the name it now bears. It was noticed in 1731 by Mairan, who considered it to be a reflection from the sun's atmosphere stretched out into a flattened spheroid. But Laplace has demonstrated that this is impossible from the extent of the heavens covered by the light, taken in connection with the fact that the sun's atmosphere can extend no further than to the orbit of a planet whose periodical revolution is performed in the same time as the sun's rotary motion about its axis, or in 25½ days; that is to say, only as far as $\frac{9}{20}$ of Mercury's distance from the sun. The theory of this philosopher, which astronomers have generally adopted, is thus presented in his *Système du monde*, in connection with his famous doctrine of the genesis of the solar system (see NEBULAR HYPOTHESIS): "If in the zones abandoned by the atmosphere of the sun there are any molecules too volatile to be united to each other or to the planets, they ought, in continuing to circulate around this star, to offer all the appearances of the zodiacal light without opposing any sensible resistance to the different bodies of the planetary system, either on account of their extreme rarity, or because their motion is nearly the same as that of the planets with which they come in contact." This rotating ring Laplace supposed to be somewhere between the orbits of Venus and Mercury. All these theories are based on Cassini's erroneous conclusion that the axis of this light has a fixed relation to the sun's equator. The remarkable meteor shower of 1833 gave an impulse to speculations respecting the zodiacal light. It was suspected that this meteoric display was owing to the passage of the earth through the substance of the light. This theory found an advocate in Biot, who argued that the earth then passed near the node of this substance. This led J. C. Houzeau to question the justice of Cassini's conclusion, and in 1844 he announced in the *Astronomische Nachrichten* that "the supposition of the existence of this light in the plane of the sun's equator does not satisfy the observations made," and that the cause of the appearance "may be more local than has been hitherto supposed." Prof. C. Piazzi Smyth gives, in the "Transactions of the Royal Society of Edinburgh," vol. xx., part iii., an account of valuable observations made at the Cape of Good Hope in 1845. —In April, 1853, the Rev. George Jones, chaplain of the United States Japan expedition, began in the Pacific ocean a series of observations, which were conducted almost daily during two years, with results of considerable import; 341 successful observations were made, all of which were charted down. They are especially valuable from being, in the observer's language, "independent of hypotheses, and independent of each other." These charts, together with accompanying explanations, were published as a supplementary volume in the report of that expedition. Humboldt and others had noticed intermittent variations in the lustre of the light, not in the nature of pulsations so much as of a rapid fading away, and a gradual brightening again. This appearance is confirmed by Mr. Jones, who speaks of a swelling out laterally and upward of the pyramid, with an increase of brightness in the light itself; then in a few minutes a shrinking back of the boundaries and a dimming of the light, almost at times as if quite dying away; and so back and forth for about three quarters of an hour. The light, though stronger at the central parts, does not shade off uniformly to the borders, but has two distinct degrees of lustre—a triangle within a triangle—two different kinds of light as it were, as if the matter was more condensed at its central parts and thinned out beyond. The inner is termed by Mr. Jones the stronger light, and the outer the diffuse light. These are not bounded by sharp lines, but melt away by degrees; still there is between the two a line of greater suddenness of transition, while the experienced eye has no difficulty in tracing the outer boundary of the diffuse light. The stronger he found to be approximately 60° in its greatest width, and the diffuse 90°. The data furnished by these observations were as follows: 1, when his position was N. of the ecliptic, the main body of the zodiacal light was on the N. side of that line; 2, when his position was S. of the ecliptic, the main body of the zodiacal light was on the S. side of that line; 3, when his position was on or near the ecliptic, the light was equally divided by the ecliptic, or nearly so; 4, when by the earth's rotation on its axis he was during the night carried rapidly to or from the ecliptic, the change of the apex and of the direction of the boundary lines was equally great, and corresponded to his change of place; 5, as the ecliptic changed its position as respects the horizon, the entire shape of the light became changed, which would result from new portions of the nebulous matter coming into position for giving him visible reflection, while portions lately visible were no longer giving him such a reflection. The first four of these results were not absolutely invariable, but the exceptions were few. Mr. Jones inferred from these observations that the zodiacal light is caused by a ring of matter surrounding the earth, not the sun; for the changes resulting from the observer's change of position on the earth, as well as from the change of position caused by the earth's rotation, seemed to him much greater than could be explained if the ring were not relatively near to the earth. These changes of appearance also seemed to correspond in character with the theory thus advanced. But it is certain that no ring surrounding the earth could possibly explain the phenomena of the zodiacal light when these are all considered together, however competent to explain the particular phenomena observed by Mr. Jones. It is to be noted in particular that the phenomena observed in high latitudes, though not so striking as those observed in low latitudes, are in reality even more instructive. It will be manifest that if there were a ring surrounding the earth at a distance so moderate that a traveller in tropical regions could recognize the zodiacal's change of position as he passed from the northern to the southern side of the equator, it would be invisible from places in high latitudes. This is clearly shown in the writer's treatise on Saturn, where the configuration of the rings viewed from different Saturnian latitudes has been carefully calculated (not merely surmised from general considerations). Even in moderately high latitudes the zodiacal, if Mr. Jones's theory were sound, ought to be seen far toward the S. point of the horizon; whereas, so far is this from being the case, that in England the average position of the zodiacal's axis in the horizon is nearly identical with the ecliptic.—The most probable interpretation of the zodiacal light is that which regards it as caused by multitudes of minute bodies travelling around the sun. At the same time two points must be carefully noted. In the first place, there are phenomena of the zodiacal which indicate some resemblance between its structure and that of comets' tails, so that not meteoric matter alone, but cometic matter also, is probably present in it. Secondly, it is highly improbable that the greater portion of the matter forming the zodiacal light travels on orbits of small eccentricity around the sun. Knowing that the orbits of meteors extend far out into space, even beyond the orbits of Uranus and Neptune, we must suppose the meteoric and cometic matter of the zodiacal to travel on paths similarly eccentric, so that the matter composing the zodiacal light at one time will at another be far beyond the bounds of its visible extent. This, indeed, so far from introducing a difficulty, helps to remove one. For it is manifest that according to this theory the zodiacal light should vary markedly in appearance from time to time, which is precisely what had been observed and had remained unexplained until the eccentric nature of meteoric orbits was recognized. The spectrum of the zodiacal appears not to be monochromatic as Angström supposed, but continuous, indicating that the zodiacal light is reflected sun light.

ZOËGA, Georg, a Danish antiquary, born in Jutland, Dec. 20, 1755, died in Rome, Feb. 10, 1809. He was the son of a Lutheran clergyman, was educated at Göttingen, started in 1782 on a numismatic tour in Germany and Italy at the expense of the Danish government, and settled in Rome, where he joined the Catholic church in 1783. He was appointed interpreter of modern languages to the propaganda college, and published *Nummi Ægyptii Imperatorii prostantes in Museo Borgiano Velitris* (4to, Rome, 1787). Pope Pius VI. commissioned him to explain the obelisks, and in 1800 appeared his great work, *De Origine et Usu Obeliscorum*, bearing the date of 1797. In 1798 he was made consul general for Denmark in the Papal States; and in 1802 he was appointed professor in the university of Kiel, but never performed the duties of this office, though he received the salary. After this he published a catalogue of the Coptic manuscripts in the library of Cardinal Borgia, and also an account of the antique bass reliefs still remaining in Rome, under the title of *I bassi-rilievi antichi di Roma, incisi da Tommaso Piroli* (2 vols., Rome, 1808). This was translated into German by Welcker (Giessen, 1811–'12), who in 1817 published at Göttingen a number of posthumous treatises of Zoëga, and in 1819 his life and letters.

ZOILUS, an ancient critic, a native of Amphipolis or Ephesus, who flourished about the middle of the 4th century B. C. He assailed the poems of Homer on account of their fabulous and incredible stories, and was therefore called *Homeromastix.* Plato and Isocrates came also under his lash, and his writings were so marked by illiberality and asperity, that his name became proverbial for a captious and malignant pretender to criticism. Dionysius of Halicarnassus, however, ranks him among the best critics. Nothing has been preserved of his works except eight titles.

ZOLA, Émile. See supplement.

ZOLLVEREIN (Ger. *Zoll*, duty, customs, and *Verein*, union), an association of German states for the purpose of levying uniform customs upon merchandise imported from abroad, and establishing internal free trade. It was contemplated in art. 19 of the compact of the Germanic confederation, and was actually commenced by Prussia, which in May, 1818, proposed to suppress all interior custom houses, and to protect domestic industry and assure revenue to the treasury by levying duties equivalent to 10 per cent. *ad valorem* on all foreign manufactures, of which nothing was to be prohibited, and on this basis to establish reciprocal free trade with other states. It was inaugurated in 1819, and was gradually joined by a majority of the states. In 1865 Austria, the two Mecklenburgs, and the Hanse towns were the only states that had not joined it. Separate treaties equalized the taxation of various members of the union. The maximum of duties on imports, according to the Prussian tariff of 1818, remained at 10 per cent. *ad valorem;* but the special imposts varied from time to time, and in 1851 the raw materials of manufactures were made free, or comparatively so. Each state guarded the frontiers which divided it from foreign countries, and provided for the collection of duties within its borders. The receipts from this source were paid into a common treasury, out of which the expenses of guarding and collecting were defrayed. Export and transit duties were also levied. The net revenue was distributed in proportion to population, for which purpose a general census was taken every three years. Each state received a greater revenue from customs than it did before joining the Zollverein. The plenipotentiaries of the respective states met in June every year to settle accounts and consider proposed changes in the tariff. The immense progress of trade and industry under this union is described in the article GERMANY, vol. vii., p. 748. The Zollverein treaty of May 16, 1865, was intended to last from Jan. 1, 1866, till 1877, but was abrogated by the war with Austria. A new treaty with the North German confederation was concluded, July 8, 1867, by Bavaria, Würtemberg, Baden, and Hesse-Darmstadt. It went into operation on Jan. 1, 1868, and included a total population of about 39,000,000. Import duties were reduced, most articles being admitted free. Foreign trade was promoted by treaties with the principal commercial nations, and a treaty with Austria was concluded early in 1868. The union was administered by a council and a parliament. The council consisted of delegates of its various members under the control of Prussia. In the parliament Prussia had 17 votes, Bavaria 6, Saxony 4, Würtemberg 4, Baden 3, Hesse 3, Mecklenburg-Schwerin 2, Brunswick 2, and the other states 1 each; total, 58. The parliament was convened by Prussia at the demand of one third of the members of the council, and first met in Berlin in the spring of 1868. The Zollverein constituted a powerful bond between northern and southern Germany, paving the way for political consolidation, and was merged in the empire. The latter now forms one customs and commercial union, excepting a few peculiarly situated localities, and the free ports of Hamburg and Bremen, but including, besides the states of the empire, the grand duchy of Luxemburg and the Austrian commune of Jungholtz on the S. frontier of Bavaria.—See *Der deutsche Zollverein*, by W. Ditmar (2 vols., Leipsic, 1867), and *L'Allemagne économique, ou Histoire du Zollverein allemand*, by Émile Worms (Paris, 1874).

ZÓLYOM (Ger. *Sohl*), a county of N. W. Hungary, in the Cis-Danubian circle, bordering on Liptó, Gömör, Hont, Bars, and Turócz; area, about 1,100 sq. m.; pop. in 1870, 101,958, chiefly Slovaks. It is traversed by branches of the Carpathian mountains, and by the river Gran, which receives the Szalatna and numerous small rivers. The climate is cold, yet grain and some wine, flax, and hemp are produced, and cattle and sheep abound. Silver, gold, copper, iron, sulphur, vitriol, and coal are found, and there are many mineral springs. Cloth, linen, leather, and brandy are made, and cheese is largely exported. The capital is Neusohl (Hun. *Besztercze-Bánya*).

ZOMBOR, a city of Hungary, capital of the county of Bács, on a wide plain near the Francis canal, which connects the Danube with the Theiss, 120 m. S. of Pesth; pop. in 1870, 24,309, mostly Serbs. It has a United Greek bishop, several churches, a public library, an orthodox Greek normal school, fine county and town halls, and a large trade in grain and cattle.

ZONARAS, Joannes, a Byzantine historian of the 12th century, born in Constantinople. Under Alexis Comnenus he was commander of the imperial body guard and first private secretary to the emperor. During the reign of John Comnenus he entered a monastery on Mount Athos, and there spent the remainder of his life in retirement and study. His principal works are his *Chronicon* or *Annales* from the creation of the world to A. D. 1118 (last ed. by Dindorf, Leipsic, 1868), and "An Exposition of the Sacred Canons, and those of the Apostles, Councils, Synods, and Ecclesiastical Fathers," printed in Greek and Latin by Beveridge in his *Pandectæ Canonum* (fol., Oxford, 1672).

ZONE (Gr. ζώνη, a belt or girdle), in the mathematical sense, the circular belt or portion of the surface of a sphere lying between any two parallel circles of the latter, or the convex surface cut off to one side by a circle of the sphere. Owing to the inclination of the earth's equator to the ecliptic or plane of the sun's path at an angle of 23° 28′, the tropics have respectively this distance N. and S. of the equator, and when the sun is over either tropic its rays are withdrawn from the surface within a like distance of the opposite pole. (See SEASONS.) There are thus naturally established four parallel circles of the earth, the two tropics and two polar circles, which with the equator divide the entire surface into six belts or portions, corresponding in pairs N. and S. of the equator. As within these several pairs of belts the relative lengths of day and night and the character of the seasons and climate differ, these portions of the earth's surface have been designated as the zones of the earth. The two lying on both sides of the equator, and bounded N. and S. respectively by the tropics, are termed the torrid or burning zones; these have continual alternation of night and day, and over any point within them the sun is vertical twice yearly. The zones lying between a tropic and polar circle on either side of the equator are respectively the northern and southern temperate zones; these also have continual alternation of night and day, but the sun is never vertical to any part of them. The portions within the polar circles respectively are the northern and southern frigid or frozen zones; throughout these zones there is in each year a period, varying from 24 hours at the polar circles to six months at the poles, during which the sun does not rise, and a corresponding period during which it does not set. The names of the torrid and frigid zones are expressive of the character of their climates; the temperate ones are characterized by alternation of hot and cold seasons, though not reaching generally the respective extremes presented by the others. The transition from any zone to another is gradual both in the relative lengths of day and night and in temperature.

ZOÖLOGY (Gr. ζῶον, an animal, and λόγος, discourse), the science which treats of the natural history and classification of the animal kingdom. Its various subdivisions, from Aristotle to Agassiz, have been noticed under many heads, the principal of which are AMPHIBIA, ANIMAL, ANIMALCULES, ANNELIDA, ARACHNIDA, ARTICULATA, CRUSTACEA, ENTOMOLOGY, ENTOZOA, ETHNOLOGY, HERPETOLOGY, ICHTHYOLOGY, INVERTEBRATA, MALACOLOGY, MAMMALIA, ORNITHOLOGY, POLYP, SPIDER, and VERTEBRATA. The distinguishing characters will be found under the several classes, orders, and families, and under BIRDS, COMPARATIVE ANATOMY, FISHES, INSECTS, MOLLUSCA, and REPTILES. Cuvier's and Agassiz's systems of classification may be found in the article ANIMAL.

ZOOLOOLAND, The War in. See p. 851.

ZOOLOOS, or Amazooloos, a nation of Caffres in South Africa. They live chiefly in the elevated country between Natal and Delagoa bay, but many are within the bounds of Natal. They are a handsome race, and appear to occupy an intermediate place between the negro and a higher type. Their complexions are brown, and their features are more regular than those of the negro, but their hair is woolly. They are tall and graceful in figure, and noted for strength and activity. According to Livingstone, they are remarkable for their honesty and hospitality; their intellectual endowments are said to be good; they are cheerful and social in disposition, and are not addicted to great vices. With the exception of local differences, the language, manners, and habits of the Zooloos are similar to those of the other Caffre tribes. (See CAFFRARIA.) They are said to have come from the north, and to have conquered their present territory about the beginning of this century. Under a chief named Chaka they overran the country as far as the S. borders of Natal. Chaka was succeeded by his half brother Dingan, and the latter by Panda, a full brother of Chaka. Under these chiefs the Zooloos had a regular military organization, their forces being divided into bands of 1,000 men each, and each band or regiment being distinguished by different colored shields. It is said that in 1840 they could put 40,000 warriors into the field. Their progress was finally checked by the Boers, and they have now, through the influence of the missionaries and the British colonists of Natal, with whom they have treaties, partly laid aside their savage habits, and live at peace with Europeans.

ZOÖPHYTES (Gr. ζῶον, an animal, and φυτόν, a plant), a term formerly applied to all plant-like animals, including *anthozoa* and *bryozoa.* The latter are now known to belong to the molluscoids, by Prof. Morse placed among the tubicolous worms; the former, or zoöphytes proper, so called from the flower-like expansion of the tentacles, are synonymous with polyps, the lowest class of radiates, and include the actinoids and halcyonoids of Dana. The zoöphytes have been sufficiently described under CORAL and POLYP; the sea anemone, one of the largest, most common, and most beautiful in northern waters, has been noticed under ACTINIA. Zoöphytes bear a strong external resemblance to flowers, and by older naturalists were in many instances mistaken for marine plants; but they are true animals.

ZOROASTER (properly ZARATHUSTRA), the founder of the ancient Persian religion. Respecting his career, his period, and his history as reformer of the earlier religion of his people, we have scarcely any trustworthy information. He was by birth a Bactrian; and the native tradition, ancient and modern, declares him to have been the son of Pourushaspa, and to have lived under a king Vistaspa (Gushtasp, Hystaspes), who accepted and favored the general adoption of his doctrines. This king was at one time regarded as identical with the father of the first Darius, and Zoroaster was accordingly assigned to the 6th century B. C.; but this opinion is now given up. The Persian traditions make Vistaspa the last of the line of Kaianian princes, ruling in Bactria; and as the Assyrian conquest of Bactria is said to have taken place 1,200 years B. C., it has been concluded with some plausibility that Zoroaster's life must have preceded that event, perhaps by no long interval, especially as the Zoroastrian scriptures betray no acquaintance with any of the nations dwelling in or near the western parts of Iran, as the Medes, the Persians, the Assyrians, &c. In the *Zend-Avesta* he appears as a being of supernatural endowments, and as receiving from the supreme divinity by personal interview, by inquiry and reply, the truths which he is to communicate to men. The earliest portions of the Avestan text, the *Gathas*, may perhaps go back in part to his own time. (See PARSEES, and ZEND-AVESTA.)

ZORRILLA Y MORAL, José, a Spanish poet, born in Valladolid, Feb. 21, 1817. He was educated in the seminary of the nobles at Madrid, studied law at Toledo and Valladolid, but devoted himself exclusively to literary studies, and in the periodical entitled *El artista* made his first appearance in print as a poet. His father, displeased with his occupations, sent for him, and placed him under the charge of a muleteer to be brought home; but on the way he managed to escape on a horse which he took from one of his relatives without permission of the owner, and with a few reals in his pocket made his way to Madrid. Here he lay concealed for some time, but on Feb. 15, 1837, at the funeral of the poet Larra, suddenly excited a great sensation by an elegy on the dead poet which he recited at the grave. In a few months his first volume of poetry appeared, and from that time the literary reputation of Zorrilla has steadily increased. He has published *Cantos del trovador, coleccion de leyendas y tradiciones históricas* (3 vols., Madrid, 1841); *Floras perdidas* (1843); and *Granada*, which is considered his masterpiece (2 vols., Paris, 1853-'4). He has written a number of comedies, of which that entitled *El zapatero y el rey* is the most popular. His *Obras completas* (2 vols., Paris, 1847; 2d ed., 3 vols., 1853) contain his biography by Ildefonso Ovejas. For some years Zorrilla lived alternately in Paris and Brussels, and then emigrated to America.

ZOSIMUS, a Greek historian, flourished in the earlier part of the 5th century. He wrote a history of the Roman empire, still extant, in six books, bringing it down to A. D. 410, which is mainly an abridgment from early historians, and written in a concise and pure style. Being a pagan, Zosimus was rather severe in his strictures on the Christian emperors, but he cannot justly be accused of a deliberate misrepresentation of facts or characters. The best editions are by Reitemeier (Leipsic, 1784) and Bekker (Bonn, 1837).

ZOUAVES (Arab. *Zwawa*), a body of French infantry, deriving their name from a tribe of Kabyles in Algeria, whose fighting men have been noted throughout North Africa for generations. After the occupation of Algiers in 1830, a body of these mercenary troops in the service of the dey were incorporated into the French army, with French officers, discipline, and arms. Frenchmen were also distributed among the companies as private soldiers, but the Arab dress was retained. The corps was afterward reorganized into distinct companies of Frenchmen and Arabs, and in 1837 it was divided into three battalions under Col. (afterward Gen.) Lamoricière. To this officer and his successor Gen. Cavaignac was due the great efficiency of the Zouaves in the many conflicts which preceded the final conquest of Algeria. Long before this time, however, the native element had been eliminated, and after 1840 the Zouaves were simply European troops uniformed as Arabs. In the Crimean war they proved the *élite* of the French infantry; and during the Italian campaign of 1859 they fully sustained their reputation. In 1852 they were reorganized into three regiments of three battalions each, to which in 1855 a fourth regiment was added. In the reorganization of the army under the law of March 13, 1875, the Zouaves consist of four regiments, each of four battalions, each battalion containing five companies, in all about 16,000 men; and three of the regiments are in the 19th army corps in Algeria. They are armed with carbines having sword bayonets, and their dress consists of a loose jacket and waistcoat of dark blue cloth, red Turkish trowsers, red fez with yellow tassel, green turban, sky-blue sash, yellow leather leggings, and white gaiters. The officers' uniform is that of the French infantry officers. During the civil war in the United States a few volunteer regiments were uniformed as Zouaves and so called; and several militia regiments in different states also bear the name.

ZRINYI, Miklós, count, a Hungarian soldier, born in 1518, killed at Sziget, near the Drave, Sept. 7, 1566. When only 12 years old, Charles V. gave him a gold chain for his conduct during the siege of Vienna. He afterward became ban of Croatia, and at the siege of Sziget with 3,000 men he resisted Solyman the Magnificent and Mohammed Sokolovich, his grand vizier, at the head of 65,000 men, for more than a month. After the Turks had taken the city, Zrinyi, setting it on fire, threw himself into the castle, and there maintained the defence, fighting day and night, and refusing to surrender though Solyman threatened to kill his son, whom he pretended to have in his power. Solyman died of rage, but Sokolovich kept up the siege, and during the final assault the defenders, reduced to 600, rushed forth and fell fighting. In this siege the Turks lost more than 20,000 men.

ZSCHOKKE, Johann Heinrich Daniel, a German author, born in Magdeburg, March 22, 1771, died at Biberstein, Switzerland, June 27, 1848. He escaped from the gymnasium in 1788 to join a company of strolling players, with whom he remained for some time as play writer. Afterward he went to the university of Frankfort-on-the-Oder, studied theology, history, belles-lettres, and political economy, and in 1792 became a private teacher in that city. He acquired some reputation by dramatic pieces, among which were his *Abällino, der grosse Bandit* (Berlin, 1793), and *Julius von Sassen* (Zürich, 1796). In 1795 he applied for a professorship, but it was refused on account of his treatise against the edict of the government in respect to religion. After travelling through Germany, Switzerland, and France, he established with Tscharner a school at Reichenau in the canton of the Grisons, which became very prosperous, and Zschokke was made a citizen. In 1798 he published *Geschichte des Freistaats der drei Bünde in Rhätien.* In the same year his school was broken up in consequence of his advocating the union of the Grisons with the Helvetic republic. Zschokke then went to Aarau, the seat of the Swiss government, was for some time chief of the department of education, and was sent as government commissioner to the canton of Unterwalden, where he restored peace. His authority was subsequently extended over the cantons of Uri, Schwytz, and Zug. In 1800 the central government made him commissioner, and he organized the Italian bailiwicks of Lugano and Bellinzona; and on his return he was made ruler of the canton of Basel, where the opposition to the land tax and the tithes had assumed a revolutionary character. Throwing himself into the midst of an armed multitude, he pacified them by his eloquence. When Aloys von Reding at the head of the central government had determined in 1801 to restore the old federal union, Zschokke resigned his offices, and retired to the castle of Biberstein in Aargau. On the establishment of a new federal union by Bonaparte in 1803, he was recalled to public life, and in 1804 was made a citizen of the canton of Aargau and appointed a member of the council of forests and mines. In the latter year he started a journal called *Der aufrichtige und wohlerfahrene Schweizerbote*, which was widely circulated and exerted great influence, and in 1807 the *Miscellen für die neueste Weltkunde*, which lasted till 1813. In 1829 he resigned his inspectorship in consequence of accusations brought against him for an article in the *Schweizerboten*, but continued to hold several other offices. Among his historical works are *Geschichte vom Kampfe und Untergange der schweizerischen Berg- und Waldcantone* (Zürich, 1801); *Geschichte des baierischen Volks und seiner Fürsten* (4 vols., Aarau, 1813–'18); and *Des Schweizerlandes Geschichte für das Schweizervolk* (Zürich, 1822; English translation, London, 1834, and, with a continuation by Emil Zschokke to 1848, by F. G. Shaw, New York, 1855; new ed., 1875). His novels and tales are exceedingly numerous; among the best are *Der Creole; Alamontade; Jonathan Frock; Oswald, oder das Goldmachersdorf;* and *Meister Jordan.* English translations comprise "Journal of a poor Vicar, the Walpurgis Night, and other Stories" (Philadelphia, 1845); a selection from his tales by Parke Godwin (New York, 1848); and "The Lover's Stratagem and other Tales," with over 100 illustrations by Linton (London, 1848). There are editions of his *Novellen und Dichtungen* in 10 volumes (New York, 1859) and in 17 volumes (Aarau, 1865). His most celebrated work is *Stunden der Andacht*, consisting of meditative and devotional essays (first published anonymously, Aarau, 1806; latest ed., 1874). It was translated into English in 1843, and after Prince Albert's death, at the request of the queen, by Frederica Rowan ("Meditations on Death and Eternity," London, 1862). His complete works comprise 40 volumes (1854–'9). His autobiography (*Selbstschau*, 1842; 5th ed., 2 vols., 1853) has been translated into English (London, 1845).

ZUCCARELLI, Francesco, an Italian painter, born at Pitigliano, near Florence, in 1702, died in Florence in 1788. He settled in Venice, excelled in landscapes, and in 1752 was invited to England, where he stood at the head of the profession in landscape, and was one of the original members of the royal academy. He returned to Florence in 1773.

ZUCCARO. I. Taddeo, an Italian painter, born in the duchy of Urbino in 1529, died in Rome, Sept. 2, 1566. As a boy he was employed as a color grinder at Rome, and at the age of 18 established his reputation as a fresco painter. He executed many works on a considerable scale, of which the most celebrated are a series of frescoes in the palace at Caprarola illustrating the glories of the Farnese family, and which were engraved in 45 plates by Prenner (fol., Rome, 1748–'50). He was much employed by the duke of Urbino and Popes Julius III. and Paul IV. His popularity, according to Lanzi, is explained by the fact that he never painted anything which could not be readily understood. **II. Federigo,** an Italian painter, brother of the preceding, born in the duchy of Urbino about 1543, died in Ancona in 1609. His first notable work, in the cupola of the Florence cathedral, was remarkable only for its size. In Rome he was employed in the Pauline chapel of the Vatican; but by caricaturing some of the papal courtiers he incurred the pope's displeasure, and subsequently worked in Flanders, and painted portraits of Queen Elizabeth and others in England. In Venice he was knighted on account of his embellishment of the grand council hall, after which he ventured to return to Rome to finish his frescoes there. Subsequently he was employed by Philip II. in the Escurial; but his works were expunged after his dismissal, though the king gave him a handsome compensation. He afterward practised his art while travelling in Italy from one town to another, founded the academy of St. Luke in Rome in 1595, and was engaged in excavations. He was also known as a sculptor, poet, and architect, and wrote *L'Idea de' pittori, scultori ed architetti.* He finished the Farnese frescoes in the palace of Caprarola and other works of his brother Taddeo.

ZUG. I. A central and the smallest canton of Switzerland, bordering on Zürich, Schwytz, Lucerne, and Aargau; area, 92 sq. m.; pop. in 1870, 20,993, nearly all Catholics and speaking German. It is mountainous in the southeast and level in the southwest, and is famous for its orchards and cattle. The N. part of the lake of Zug is in this canton, and the S. part in Schwytz. It is about 1,400 ft. above the level of the sea, 8 m. long and from 1 to 3 m. broad, and navigable for steamers; the banks are low or gradually sloping hills, except on the south, where the precipices of the Rigi, which is between Lakes Zug and Lucerne, in conjunction with the more distant Mt. Pilatus, present a picturesque panorama. At the S. E. corner of the lake is the Rufi or Rossberg, 5,200 ft. high. In the S. E. part of Zug is the small lake of Egeri, nearly 2,400 ft. above the sea, with romantic scenery. On its shores, on the confines of Zug and Schwytz, is the site of the battle of Morgarten, where in 1315 the Swiss conquered their independence. The Lorze, an outlet of this lake, drains the canton, passes through the lake of Zug, and finally flows into the Reuss. Zug was the seventh canton admitted into the confederation, in 1352. It joined the Sonderbund founded in 1843, and sided with the Catholics in all subsequent contests. The constitution of 1848 is more democratic than the former ones. The great council consists of 67 members, five of whom are chosen by that body, and the rest by the people. The executive council consists of 11 members. **II.** A town (anc. *Tugium*), capital of the canton, at the N. E. end of Lake Zug, 15 m. S. of Zürich; pop. in 1870, 4,279. It is situated at the foot of the Zugerberg and surrounded by orchards and vineyards. It has old walls, an arsenal, a college, and a library. The church of St. Michael, in the outskirts, has a fine cemetery.

ZUINGLIUS. See ZWINGLI.

ZULULAND, War in. See supplement.

ZUMBUSCH, Kaspar, a German sculptor, born in Munich about 1830. He has executed the monument of Maximilian II. at Munich, that of Beethoven at Augsburg (1874), and many busts and statues, including those of Louis II., Wagner, Schönbein, and Rumford.

ZUMPT, Karl Gottlob, a German scholar, born in Berlin, March 20, 1792, died in Karlsbad, June 25, 1849. He studied under Creuzer in Heidelberg, and under Wolf and Böckh in Berlin, and was successively lecturer at the Werder and professor at the Joachimsthal gymnasium, and professor of history at the military school, and of Roman literature at the university of Berlin, where he became full professor in 1838. He published a Latin grammar (Berlin, 1818), which has passed through many editions, and was translated into English by Dr. L. Schmitz (3d ed., London, 1852), and an abridgment of it; editions of Quintilian, Cicero, and Quintus Curtius; numerous writings relating to Roman antiquity and to the life and usages of the Roman rulers; *Annales Veterum Regnorum et Populorum, imprimis Romanorum* (1819; 3d ed., 1862); *Ueber die bauliche Einrichtung des römischen Wohnhauses* (2d ed., 1851); and *Die Religion der Römer* (1845).—His nephew, AUGUST WILHELM ZUMPT (born in Königsberg, Dec. 4, 1815, and since 1851 professor of classical philosophy at the Friedrich Wilhelm gymnasium in Berlin), has written his life, and also *Commentationum Epigraphicarum ad Antiquitates Romanas pertinentium Volumen* (2 vols., 1840–'54), *Studia Romana* (1859), *Das Criminalrecht der römischen Republik* (4 vols., 1865–'8), *Der Criminalprocess der römischen Republik* (1871), &c.

ZUÑIGA. See ERCILLA Y ZUÑIGA.

ZUNZ, Leopold, a German Hebraist, born in Detmold, of Jewish parents, Aug. 10, 1794. He studied under Wolf, De Wette, and Böckh in Berlin. He was preacher at the German synagogue in 1820–'22, one of the editors of the *Spener'sche Zeitung* from 1824 to 1832, and from 1825 to 1829 also principal of the new Jewish communal school. In 1835 he became preacher at Prague, and from 1839 to 1850 was director of the normal seminary at Berlin. In 1845 he was adjoined to the commission appointed by the government for devising measures in regard to the educational and communal interests of the Jews in Prussia. His writings include *Etwas über die rabbinische Litteratur* (Berlin, 1818); *Die gottesdienstlichen Vorträge der Juden* (1832), a work of wide scope, which placed him in the foremost rank of Jewish historical critics; *Die Namen der Juden* (1836); *Die synagogale Poesie des Mittelalter* (1855); *Der Ritus des synagogalen Gottesdienstes geschichtlich entwickelt* (1859); *Literaturgeschichte der synagogalen Poesie* (1865); and *'Ir-ha-Tzedek* (in Hebrew, 1874). The first volume of his *Gesammelte Schriften* was published in 1875.

ZURBARAN, Francisco, a Spanish painter, born in 1598, died in Seville in 1662. He was educated in the school of Juan de Roelas in Seville, and early formed his style on that of Caravaggio. He also gave great attention to draperies, which he never painted without the object before him, and in general made nature his guide in all things. He first brought himself into notice by a series of pictures for the chapel of St. Peter in the cathedral of Seville, illustrating the life of the apostle; and about 1625 he executed his picture of "St. Thomas Aquinas received into Heaven," which is esteemed his masterpiece, and one of the most admirable pictures ever executed in Spain. His pictures from the life of St. Jerome for the Hieronymite friars at Guadalupe are also characteristic specimens of his style. He executed many works for churches and monasteries in Seville, Guadalupe, and Madrid, and subsequent to 1633 was nominally painter to the king, although it was not until about 1650 that he was employed at court. His works are most numerous in Seville, and are rarely met with out of Spain.

ZÜRICH. **I.** A N. canton of Switzerland, bounded N. by Schaffhausen and the grand duchy of Baden, E. by Thurgau and St. Gall, S. by Schwytz and Zug, and W. by Aargau; area, 665 sq. m.; pop. in 1870, 284,786, chiefly of German origin, and all Protestants excepting about 18,000 Catholics and 500 Jews. It is in the basin of the Rhine, which forms part of the northern boundary line, while the Reuss bounds the S. W. corner. The Thur, Töss, Glatt, and Limmat (the last issuing from the lake of Zürich, and joined by the Sihl) form fine valleys. The highest elevations do not exceed 2,800 ft., and consist of a chain of hills extending from S. E. to N. W. Pasturage, agricultural products, and fruit abound; wine and timber are produced, and the canton has many manufactories of cotton, silk, and machinery. The schools of the canton are among the best in Switzerland. German is the prevailing language, and a patois known as Swiss German is much used in conversation.—Zürich joined the Swiss confederacy in 1351, as the fifth canton; it seceded about 1440 on account of disputes as to the Toggenburg inheritance, allied itself to Austria, suffered a bloody defeat at Pfäffikon in 1443, and finally returned to the confederacy in 1450. Early in the 16th century it became the centre of the reformation under Zwingli, and in it was fought the battle of Kappel, which decided the peace of 1531. (See SWITZERLAND.) In modern times the canton took a leading part against the Sonderbund, the dissolution of which was formally decreed by a majority of 12½ votes (July 20, 1846) upon its original motion in the diet of 1845. The latest modification of the constitution dates from 1869, when it became still more democratic. The legislature consists of a great council, and the executive of a governmental council of nine members, elected by the former body for four years. The canton is divided into 12 districts. Next to the capital, the most important town is Winterthur. **II.** A city (anc. *Turicum*), capital of the canton, on both sides of the Limmat and at the N. W. end of the lake of Zürich, 58 m. N. E. of Bern; pop. in 1870, 21,199 (with the adjoining suburban communes, 56,700). It is divided into the Kleine Stadt on the left bank of the Limmat and the Grosse Stadt on the right bank. The Grossmünster or cathedral, dating from the 11th century, is chiefly remarkable for its associations with Zwingli. In the Peterskirche Lavater was minister. Among other notable churches are the Frauenmünster and Barfüsserkirche. The new arsenal, the music hall, and especially the new polytechnic institute, are the finest public buildings. The university in 1875 had 72 professors and 375 students, including in medicine women from Russia and the United States, to whom degrees are given. The city has a public library of upward of 60,000 volumes, an archæological museum, and a cremation society established early in 1874. Zürich has been greatly improved and embellished by new buildings, bridges, and railway stations. It is associated with the memories of many distinguished reformers, poets, and scholars, and is still a great intellectual and artistic centre. It has a large book trade, and is noted also for its manufactures of silk, cottons, machinery, and paper. The fine environs, promenades, and hotels make it a favorite resort of tourists.—Zürich is one of the oldest towns in central Europe. In 1219 it was declared a free imperial city. From 1519 to 1531 Zwingli preached the doctrines of the reformation in the cathedral. It had previously furnished a secure shelter to Arnold of Brescia. During the reign of Queen Mary it was a place of refuge for many English Protestants, and Miles Coverdale here translated and carried through the press in 1535 the first English version of the Scriptures ever printed. On Sept. 25, 1799, Masséna defeated the Russians under Korsakoff in the immediate vicinity of the city. The appointment of David Friedrich Strauss in 1839 to a professorship resulted in a bloody riot and the flight of the authorities. A treaty of peace between France, Italy, and Austria was signed here, Nov. 10, 1859, mainly in accordance with the stipulations of Villafranca.

ZÜRICH, Lake of, a lake of Switzerland, in the cantons of Zürich, St. Gall, and Schwytz, about 25 m. long from S. E. to N. W., from 1 to 2 m. wide, and about 600 ft. deep. Its banks are lined with thriving villages, and the hills around it slope gradually to the lake from a height of 2,500 to 3,000 ft., and are covered with farms, gardens, vineyards, and orchards. The Limmat issues from its northern extremity, and transmits its waters to the Aar. It is divided by the bridge of Rapperschwyl into two parts, called the upper and lower lakes.

ZURITA, Gerónimo, a Spanish historian, born in Saragossa in 1512, died there about 1580. He was the son of the favorite physician of Ferdinand the Catholic, was educated at Alcalá, was chief magistrate of several towns, in 1543 became a member of the supreme council of Castile, in 1547 historiographer of Aragon, and subsequently private secretary to the king and chief of the correspondence of the inquisition. He obtained from the government an order authorizing him to examine all public archives and libraries, and armed with this commission he traversed Spain, Sicily, and Italy. His *Anales de la corona de Aragon* (6 vols. fol., Saragossa, 1562–'79; completed in 6 vols. fol., 1610, and in 7 vols., 1669) embraces the period extending from the rise of the kingdom after the Arabian conquest to the death of Ferdinand the Catholic.

ZUTPHEN, a city of the Netherlands, in the province of Gelderland, situated on the Yssel at the mouth of the Berckel, 17 m. N. E. of Arnhem; pop. in 1869, 14,554. It is very strongly fortified; the ancient ramparts are planted with trees, and form a fine promenade. The principal edifices of note are the fine Gothic church of St. Walburga, erected in 1105, which contains a library of very old books; the city hall, with five façades; the state hall; and the public weighing house, the tower of which has a chime of 36 bells. There is trade in timber and colonial products.—The town is of great antiquity. It belonged to the bishops of Utrecht in the 13th century, and in the 14th joined the Hanseatic league. It was subjected to terrible sufferings by the Spaniards in 1573, and was taken by Maurice of Nassau in 1591, and by the French in 1672. It was on the battle field of Warnsfeld, very near this city, that Sir Philip Sidney was mortally wounded in 1586, while the enemy was defeated under the walls of Zutphen.

ZUYDER ZEE, or **Zuider Zee** (South sea), a bay or gulf on the coast of Holland, so named because it is separated by the islands of Texel, Vlieland, Ter Schelling, and Ameland from the North sea or German ocean. It is bounded N. W. and N. by the islands already named, E. by Friesland and Overyssel, S. E. by Gelderland, and S. and W. by Utrecht and North Holland; length from N. to S. about 80 m., greatest breadth about 35 m. A projecting peninsula partially divides it near the middle, S. of which it expands to its greatest width. At its S. W. extremity an arm called the Y branches off and extends into the province of North Holland; it is navigable by vessels of considerable size, and forms the harbor of Amsterdam. Formerly this arm extended W. to within a few miles of the North sea, but most of it has recently been drained. The shores of the Zuyder Zee on the east and southeast are several feet above the sea level, but those on the west are only protected from inundation by strong dikes. The sea is generally deep enough for vessels drawing not over 15 or 18 ft., but navigation is obstructed by shoals. The most important tributary is the Yssel.—In the time of the Romans the Zuyder Zee was a low swampy lake called Flevo, and communicated with the North sea by a stream bearing the name of Flevum. In 1219 a severe inundation took place in consequence of continued N. W. winds, broke down the dikes, and made considerable encroachments on the land. In 1282 a still more terrible one occurred, which submerged 72 towns and villages and drowned nearly 100,000 persons. By this calamity it became an arm of the sea, and attained its present dimensions. Investigations have recently been made at the expense of the Dutch government with a view to the drainage of most of the southern half of the sea, and the state commission has pronounced the scheme practicable. It is proposed to construct an enormous dike, extending from Enkhuisen on the W. shore to the island of Urk, and thence to the E. shore at Kampen, a total distance of about 25 m. The basin thus enclosed would embrace nearly 800 sq. m. or about 500,000 acres, an area nearly equal to that of the province of Limburg. The bottom consists of thick beds of rich alluvium traversed by great banks of sand, one of which forms the line of the projected dike, and would serve as its foundation. Nearly the whole of the land, it is thought, would be suitable for cultivation. The plan contemplates a network of canals and watercourses, and the time required for the whole undertaking is variously estimated at from 12 to 20 years, and the cost in round numbers at about $50,000,000.—See *Visite aux villes mortes du Zuyderzée*, by Henri Havard (Paris, 1875; English translation by Annie Wood, London, 1875), and *Le dessèchement du Zuyderzée*, by George Herelle, in the *Revue des Deux Mondes*, Nov. 15, 1875.

ZWEIBRÜCKEN (Lat. *Bipontium;* Fr. *Deux-Ponts*), a city of Bavaria, in the Rhenish Palatinate, on the Erbach, 40 m. W. by S. of Spire; pop. in 1871, 8,395, three fourths of whom were Protestants. Its names, each meaning two bridges, are derived from the situation of its ancient castle between two bridges over the Erbach. The city consists of the Altstadt, Neustadt, and Untere Vorstadt, the finest of all. The most notable churches are the Alexanderskirche and the Karlskirche, built by Charles IX. of Sweden. The ducal palace, in the 17th century one of the most magnificent in Germany, was in 1868 converted into a palace of justice. The Little Château contains the national stud. There are a gymnasium and a school of trades. Cloth, silk, chiccory, machines, and other articles are manufactured. A celebrated series of the classics, called the Bipont editions, was published here in the latter part of the last century. About 2 m. from the city are the ruins of the château built by King Stanislas Leszczynski.—Zweibrücken was an independent county till 1394, when after the extinction of the local counts it formed part of the Palatinate. In 1410, after the division of the electoral territory on the death of the emperor and elector Rupert, it became a duchy under his third son Stephen, who founded the line of Pfalz-Zweibrücken. Charles Gustavus, an offspring of this house, in 1654 succeeded Queen Christina on the throne of Sweden, to which this duchy was annexed. In 1718, after the death of Charles XII., it passed to the count palatine Gustavus Samuel Leopold of the Klenburg line; and as he left no issue, it subsequently reverted to the

Birkenfeld line, the ancestors of the present Bavarian dynasty. It belonged to France from 1801 to 1814, when most of it was restored to Bavaria, and the rest divided between Oldenburg, Saxe-Coburg, and Hesse-Homburg.

ZWICKAU, a city of Saxony, capital of a district of the same name, on the left bank of the western or Zwickauer Mulde, about 60 m. S. W. of Dresden; pop. in 1871, 27,322. It has five churches, including St. Mary's, with a lofty tower and the largest bell in Saxony, and St. Catharine's, with an altarpiece by the elder Cranach; a gymnasium, with a library of 20,000 volumes, and other schools; and a national workhouse in the former Osterstein palace. The thirty years' war reduced the population from 10,000 to 4,000. After Saxony joined the Zollverein it rapidly increased. Coal mines which occupy over 6,000 men, and the Queen Mary iron works, are in the vicinity. Chemical products, paper, and glass are also made.—Zwickau is first mentioned in 1118. Thomas Münzer became pastor here in 1520.

ZWINGLI, or (as it is often Latinized) **Zuinglius, Ulric or Huldreich,** a Swiss reformer and patriot, born at Wildhaus, a mountain village of Toggenburg (now canton of St. Gall), Jan. 1, 1484, fell on the field of Kappel, Oct. 11, 1531. His father, Ulric Zwingli, was a shepherd and bailiff of Wildhaus, and a brother of his father, Bartholomew Zwingli, was pastor there. As a child Ulric listened eagerly to the story of the oppression under which his native land had often suffered, and he learned patriotism among his earliest lessons. When he was ten years old he was sent to the St. Theodore school at Basel, and in 1497 to a classical school just opened at Bern by Wolflin (Lupulus), a distinguished scholar and poet. In 1499 he went to Vienna, where he studied philosophy in the university for two years, and then resumed his studies, especially scholastic theology, in the university of Basel, acting at the same time as teacher in the school of St. Martin. He was passionately fond of study, but cultivated also the lighter and more ornamental accomplishments, especially music. As early as his 18th year the study of the New Testament had awakened in his mind doubts in regard to many of the teachings of the church. These were increased by the instructions of Thomas Wittenbach, a teacher of theology, who in 1505 came from Tübingen to Basel, and around whom Ulric and all the young students gathered. In 1506 he was ordained by the bishop of Constance, and the same year became pastor of the large parish of Glarus, not far from his birthplace. At this time the king of France, the duke of Milan, and the pope were seeking to draw the Swiss into the foreign military service. Zwingli's heart was aroused, and he labored with tongue and pen to urge his countrymen to recover and maintain their ancient honor. In 1510 he wrote his noted poetic fable, in which he represents the confederacy under the symbol of an ox led astray by artful cats, though warned by faithful dogs, by which means the ox lost his liberty. Twice during this time he was ordered by his government to accompany the troops of his canton in the Italian war. He first went with the confederate troops against Louis XII. of France; and two years later, when Francis I. undertook to reconquer the duchy of Milan, Charles of Austria (the future Charles V.) called upon the Swiss for help, and Zwingli accompanied the soldiers of Glarus through the campaign as chaplain. They were defeated; and a few days after the battle of Marignano, in September, 1515, Zwingli delivered an address to the Swiss, exhorting them no more to expose their honor and their lives in so foolhardy a way. In 1516 the king of France again used money and flattery to enlist the confederates in his favor, and, in spite of Zwingli's efforts, succeeded even in Glarus, where the French party gained the ascendancy. Zwingli withdrew to Einsiedeln, where he accepted a subordinate vicarship. During his ministry at Glarus he had diligently studied the New Testament in the original Greek, committing to memory the epistles of St. Paul, and advancing himself and his parishioners in its knowledge. At Einsiedeln he committed to memory the remaining portions of the New Testament, and afterward also portions of the Old. His opposition to several of the teachings and practices of the church grew daily more decided. The convent of Einsiedeln possessed an image of the Virgin of which miraculous stories were told, and over the convent gate was written: "Here the full forgiveness of all sins is to be obtained." The legends and the inscription stirred Zwingli to indignation. He preached Christ as the only sacrifice and ransom for sin. To the pope's nuncio, who called him to account, he said: "With the help of God will I go on preaching the gospel, and this preaching will make Rome totter." His efforts were victorious. The governor caused the inscription to be blotted out from the gate, the relics which the pilgrims revered were buried, and the new doctrine prevailed. In the beginning the evangelical movements in Germany and Switzerland were entirely independent of each other. "I began," said Zwingli, "to preach the gospel in the year of grace 1516, that is, at a time when the name of Luther had never been heard among these countries. It was not from Luther that I learned the doctrine of Christ; it was from God's word. If Luther preaches Christ, he does as I do; that is all." A worthy priest on one occasion said to him: "Master Ulric, they tell me you have gone into the new error, and that you are a follower of Luther." "I am no Lutheran," said Zwingli, "for I understood Greek before I had heard the name of Luther;" intimating thereby that the study of the Greek Testament had taught him the necessity of a reformation. D'Aubigné has correctly said: "Zwingli did not communicate with Luther. Doubtless there was a bond of communion between both these men; but we must seek it above this earth." In 1518 the cathedral church in Zürich became vacant, and on Dec. 11 Zwingli was elected to it, and henceforth Zürich became the centre of the reformation in Switzerland. On New Year's day, 1519, he entered the pulpit the first time, with an immense crowd before him. "To Christ," cried he, "to Christ will I lead you —to the source of salvation. His word is the only food I wish to furnish to your hearts and lives." He went on to expound the Gospel according to St. Matthew, chapter by chapter, and later the other Gospels, the Acts, and all the epistles in the same way. "The life of Christ," he said, "has been too long hidden from the people." He attacked with equal firmness the vices of all ranks and stations. On every Friday he explained the Psalms for the peasants who came in to market on that day. Here, as before at Glarus, next to his love for the gospel was his patriotic love for the fatherland. He reproved all those who for flattery and money lent themselves as tools to foreign powers, charging them with selling their own flesh and blood. "The cardinal of Sion," he exclaimed, "who recruits for the pope, with right wears a red hat and cloak; you need only wring them and you will behold the blood of your nearest kinsmen flowing from them!" Besides his love of country, the necessity of constantly opposing this mercenary tendency among the Swiss may explain the large element of patriotism which everywhere manifested itself in Zwingli's life and acts. Piety and patriotism were one life in him. His numerous labors at Zürich injuring his health, he repaired to the baths of Pfäffers; but hearing that the plague had broken out in Zürich, he hastened back to his flock. He was soon himself seized by the plague, and given up to die, but recovered, inspired with new devotion to his work. Flattery and indirect bribes, as several times before, were plied to divert him from his purposes. A cardinal and several nuncios proposed to raise his pension from 50 to 100 florins, on condition that he should preach no more against the pope. "We are not reproached," said he, "as apostates or as rebels, but flattered with high titles." In March, 1522, the outward church service was considerably altered, and some ceremonies were dropped. The bishop stoutly resisted the change, but Zwingli triumphed in a discussion before the council. Combinations were formed against him, and a plot was even laid to take his life by poison. The council of Zürich placed a guard around his house every night. In the same year evangelical preaching, which had only been allowed, was enjoined. In July Zwingli drew up a petition to the bishop, signed by himself and ten friends of Zürich and Einsiedeln, asking that free way be opened through the cantons for the gospel, and that the law imposing celibacy upon the priests be abolished. This kindled a fire. Myconius, who favored it, was banished by the diet from the country. At Lucerne Zwingli was burned in effigy. With the hope of allaying the growing troubles, the magistrates of Zürich appointed a religious conference in January, 1523, at which pastors, curates, and preachers were invited to take an active part. Zwingli presented 67 theses for consideration. A second conference held in October of the same year ended in the complete triumph of the reformer and his friends. On April 2, 1524, Zwingli married Anna Reinhard, widow of a distinguished magistrate, who proved to him a pious and affectionate wife. A new trouble now arose. The Anabaptists desired Zwingli to establish a community of only true believers, demanded the abolition of tithes, and insisted upon all kinds of freedom of the flesh under cloak of freedom of the spirit. They ran into such riot of fanatical excesses and crimes that they became dangerous to the state, and had to be dealt with by the civil authorities. Zwingli wrote his "Tract on Baptism" against their tenets. A public discussion was held with them; but the movement was wild, and continued for a long time to harass both church and state. In 1528 Zwingli was called to take part in the disputation at Bern, where Haller was laboring in the cause of the reformation. He went accompanied by several German and Swiss theologians, and an escort of 300 men. The disputation continued through eighteen sessions. At the close ten articles favoring the reformation, drawn up by Haller, were subscribed by the majority of the clergy. In four months that entire canton was fraternally united with Zürich. Basel followed in January, 1529; psalms in German began to resound in the churches; and on April 1 public worship was arranged after the example of Zürich. St. Gall and Schaffhausen were also greatly moved. To this part of Zwingli's life belongs the well known difference between the German and Swiss reformers on the subject of the Lord's supper. As early as 1527 pamphlets began to pass between them. Luther wrote violently and warmly; Zwingli replied calmly and coolly. Philip, landgrave of Hesse, in order to reconcile these differences and bring the reformers together, invited all the theologians of the differing parties to meet in friendly conference at Marburg. The conference was held Oct. 1–3, 1529; and it ended without full reconciliation. At the close Zwingli was in tears, exclaiming: "Let us confess our union in all things in which we agree; and as for the rest, let us remember that we are brothers." "Yes, yes," exclaimed the landgrave, "you agree. Give, then, a testimony of unity, and recognize one another as brothers." "There is no one upon earth with whom I more desire to be united than with you," said Zwingli, approaching the Wittenberg doctors. Œcolampadius and Bucer said the same. "Acknowledge them, acknowledge them as brothers," continued the landgrave. For a moment it seemed as if they would unite. Luther himself relates that Zwingli, bursting into tears, approached him, holding out his hand. Luther rejected him, repeating over and over: "You have a different spirit from ours!" After some further consultation, terms of mutual peace and good will, if not of unity, were agreed upon, and they signed articles drawn up by Luther himself at the request of both parties, stating the points on which they had all agreed. Zwingli returned to Zürich Oct. 19, 1529, only to find new troubles in his fatherland. Between friends and foes of the reformation the lines had now been drawn. Three cities and cantons stood on one side, and five cantons on the other. The reformed free cities demanded: 1, that their calumniators should be duly punished; 2, that the poor people, who had been driven from house and home on account of their faith, should be permitted to return; 3, that the religious doctrines of one district should be tolerated in others. To these demands the five Catholic cantons, Schwytz, Uri, Unterwalden, Lucerne, and Zug, would not agree. The Zürichers resolved to obtain their rights by force. Zwingli favored prompt warfare. Bern also favored forcible measures, but recommended first merely a withdrawal of the means of subsistence from their opponents, a measure which only exasperated them. A treaty of peace, concluded at Kappel, June 25, 1529, did not long stand sacred. Zwingli was filled with apprehension. Even Zürich was not free from internal dissensions. Discouraged, he proposed to withdraw from the city, but yielded to entreaty, and consented to remain. Ministers passing through the Catholic cantons were arrested, and one, Jacob Kaiser, was burned. To punish these acts, the reformed cantons cut off their supplies, whereupon the Catholics commenced hostilities. On Oct. 9, 1531, a company of soldiers from Lucerne passed over the borders and committed depredations. On the 10th vessels laden with soldiers sailed up the lake of Zug, and 8,000 men came to rendezvous in Zug. This took the Zürichers by surprise; but they gathered their forces, and Zwingli received orders to accompany the army as chaplain. He was discouraged, yet was not without faith. "Our cause," said he to his friends, "is a righteous one, but badly defended. It will cost me my life, and the life of many an upright man who wishes to restore to religion its original purity, and to his country its ancient morals. But God will not forsake his servants; he will help even when you believe all is lost. My confidence is in him alone. I submit myself to his will." The odds were great, 8,000 men against 1,900, and the conflict terrible. After the battle had begun, the captain of arquebusiers proposed to await on the heights with the banner the arrival of the reënforcements that were coming from Zürich. Zwingli opposed this. He could not look on while his brethren were shot down in battle. "In the name of God," he exclaimed, "will I go to them, to die with them, or to aid in their deliverance." The Zürichers were brave, but too few; and their enemies prevailed. While stooping down to console a dying soldier, a stone hurled by the vigorous arm of a Waldstädter struck Zwingli on the head, and closed his lips. He rose again, when two blows upon the leg struck him down. Twice more he sprang up; but a fourth time he was thrust by a lance, when he staggered and fell beneath his wounds. Prowling over the field after the battle in search of plunder, two soldiers came near to the reformer without recognizing him. They asked him whether he desired a priest to confess. He could not speak, but gave the sign, "No." They told him that, as he could not speak, he should at least think in his heart of the mother of God, and call upon the saints. Zwingli shook his head, and kept his eyes fixed on heaven. The soldiers, now infuriated, began to curse him, adding: "We doubt not you are one of the heretics of this city." A fire had been kindled near the spot; and one of the soldiers, curious to know who it was, turned Zwingli's face toward the light. Suddenly he dropped him surprised, saying: "I think it is Zwingli." At that moment Captain Fockinger, a mercenary from Unterwalden, drew near, having just heard the last words of the soldier. "Zwingli!" he exclaimed, "that vile heretic Zwingli! that rascal! that traitor!" Then raising his sword, he struck the dying reformer on the throat, exclaiming in a violent passion: "Die, obstinate heretic!" The body lay on the field over night. In the morning, at the demand of a mob, it was tried, formally condemned to be quartered for treason against the confederation, and then burned for heresy. The sentence was carried out by the executioner of Lucerne. The ashes were mingled with the ashes of swine, and the furious multitude, rushing upon the remains, flung them to the winds of heaven.—Zwingli has been censured for his confidence in the virtue of the civil arm. He believed that the fatherland belonged to Christ and the church, and must be defended for their sake; and that Switzerland could only give itself to Christ so far and so long as it was free. He was a man of fine appearance, prepossessing manners, polite address, pleasing conversation, extensive and sound learning, and brilliant genius. He has been represented as having been, more than any other of the reformers, radical and revolutionary in his reformatory movements; but Dr. Ebrard, in his "History of the Doctrine of the Lord's Supper," shows that this charge "is no better than a pure fiction of fancy, or theological prejudice;" that Zwingli was fully as conservative as Luther, and much more so than Calvin, in the matter of doctrine and worship. (See LORD'S SUPPER, and REFORMED CHURCH.) Among all his writings, Zwingli has left no symbol of faith, no system of positive theology. His 67 theses, like all his writings, are prevailingly polemical. Attempts have however been made to elaborate and systematize his divinity from his works. (See Dr. Eduard Zeller, *Das theologische System Zwingli's dargestellt*, Tübingen, 1853; and Sigwart, *Ulrich Zwingli: der Character seiner Theologie*, Stuttgart and Hamburg, 1855) A complete collection of his writings has been published in 8 vols. (Zürich, 1828). Of the numerous biographies of Zwingli may be mentioned Hottinger's *Huldreich Zwingli und seine Zeit* (Zürich, 1841), and Christoffel's *Huldreich Zwingli's Leben und ausgewählte Schriften*, in *Die Väter der reformirten Kirche* (Elberfeld, 1857).

ZWIRNER, Ernst Friedrich, a German architect, born at Jakobswald, Silesia, Feb. 28, 1802, died in Cologne, Sept. 22, 1861. He was a pupil of the school of architecture at Breslau, and afterward studied under Schinkel in Berlin. He was attached to the superior administration of architecture in 1828, and executed several important works, mostly after the plans of Schinkel. In 1833 he was appointed architect of the cathedral of Cologne, which had been commenced about 600 years before. Zwirner drew his plans, made the necessary estimates, and then appealed to Germany for assistance. The transept and the north and south portals were completed according to his designs a little more than a year after his death. He designed and in several cases superintended the erection of numerous churches and castles along the banks of the Rhine. At the time of his death he was president of the council of architecture of the province of Cologne, and a Prussian privy councillor.

ZWOLLE, a city of the Netherlands, capital of the province of Overyssel, on the Zwarte Water and near the Yssel and Vecht, all tributaries of the Zuyder Zee, about 50 m. E. N. E. of Amsterdam; pop. in 1875, 21,329. It is connected with the Yssel by the Willemsvaart canal, has three suburbs, and fine streets, squares, and promenades. The principal church is St. Michael's, with a celebrated organ. The city has a Latin school, a drawing or trades school, a school of navigation, a public library, a museum of natural history, a theatre, large cattle, corn, and fish markets, cotton factories, dye houses, and ship yards, and an extensive trade. Thomas à Kempis in 1400 began his noviceship at the monastery of Mount St. Agnes, 3 m. N. of Zwolle, where he is buried. Adjoining the city is the thriving village of Zwollerkerspel, with more than 5,000 inhabitants.—Zwolle was fortified in 1223, and became a Hanse town. After the expulsion of the Catholics in 1580 it joined the states general. In 1672 it surrendered to Galen, the warrior bishop of Münster. The strong fortifications were razed in 1674, and subsequently restored, but recently they have again been demolished.

ZYMOSIS (Gr. *ζύμωσις*, fermentation), a term used in speculative pathology to denote the action of a peculiar and little known process analogous to fermentation. From remote antiquity various hypotheses have prevailed to account for the morbid changes of the blood in epidemic, endemic, and infectious or contagious diseases; but most of them have been so inseparably connected with the old humoral pathology that they received little consideration till rendered plausible by the researches of modern chemists, who assume the analogy of yeast in producing fermentation and a virus or poison producing its effects upon the system through the blood. According to the views of some, a zymotic change of the blood is due to catalysis, or continuous molecular action: for example, a decomposing organic molecule is introduced into the human body, and by a law of catalysis, induction, or contact, this molecule or germ imparts its own motions to other molecules with which it may come in contact. Chemists have defined this change to be "decomposition by contact" or the "action of presence." The term zymosis was introduced by Dr. William Farr, and includes epidemic, endemic, and contagious diseases, which are enumerated further on. An illustration of this law is the power which small quantities of certain substances possess of causing unlimited quantities to pass into the same state. Other analogies are the contagion of motion, as witnessed when a stone is dropped into water, the diffusion of heat from molecule to molecule, the phenomena of crystallization, or the solution of an alloy of platinum and silver in nitric acid, when the platinum, which under ordinary circumstances is insoluble in nitric acid, takes on the action that is transmitted through the atoms of silver. A more remote analogy is the setting in motion of one multiplying wheel by another, or the extension of a conflagration to surrounding combustibles. An illustration more to the point is the molecular motion that takes place in the modern operation of skin grafting.—We are still ignorant of the different viruses, contagions, poisons, miasmata, &c.; but it can be shown, in attempting to trace some of their phenomena, that the introduction of putrid or contagious matter into the animal system gives rise to factitious diseases having all the characteristics of essential fevers. The following observations have been adduced in reference to this point. Subjects in anatomical theatres frequently pass into a state of decomposition, which is communicated to the blood of the living body. Putrefying blood, brain, eggs, &c., laid on recent wounds, cause vomiting, lassitude, and death after a longer or shorter interval. Numerous experiments have demonstrated that putrid matter injected into the blood of healthy animals gives rise to a set of symptoms analogous to typhus. Injecting yeast or sugar into the circulation excites many of the ordinary kinds of fermentation, giving rise to a disease like typhoid fever. A universal observation is that the origin of epidemics is often to be traced to the putrefaction of large quantities of animal and vegetable matters; that miasmatic diseases are endemic in places where the decomposition of organic matter is constantly taking place, as in marshy and moist localities; that they are developed epidemically under the same circumstances after inundations, and also in places where a large number of people are crowded together, with insufficient ventilation, as in ships, prisons, and besieged places. Factitious fevers, produced by the introduction of deleterious substances directly into the blood, are analogous both in their symptoms and pathological lesions to those produced by the sting or bite of certain animals; they present also the same general class of symptoms that are present in smallpox, scarlatina, and other eruptive diseases. Putrid animal exhalations have given rise to diseases that have raged like a pestilence or epidemic. Measles can be communicated by means of a drop of blood from a patient affected with the disease; the inoculation of an unprotected person with smallpox may be the means of giving the disease to thousands; and a mere trace of serum is sufficient to propagate cattle plague. Recent researches into the peculiar nature and origin of the fever poison, or "disease germ," have not done much toward elucidating the question. Spectroscopic examination of the contagious fluids, variations of temperature, symptoms of the patient, anatomical alterations, and microscopic and chemical study of the blood upon the living and dead have furnished no notions sufficiently precise to draw any practical deductions. The most widely prevailing doctrine of the present day respecting the origin and communication of disease is that known as the germ theory. Special organic forms known as microzymes, bacteria, bioplasts, &c., alleged by various pathologists to be found in contagious fluids, have been the subject of much discussion, some contending that they are of a fungoid growth and enter the body as parasites, others that they are germinal masses derived from normal cells, and due to a series of changes in existing matter under new circumstances; while a third class deny positively that any such germs exist. The elements or factors giving rise to many of the conditions above mentioned are known as zymotic, a term, like the atomic theory in chemistry, not clearly descriptive, but admitted into the standard nomenclature of medicine as a convenient expression, and including all that class of diseases which can be communicated from existing foci, and which are capable of being prevented by hygienic and other conditions. The latest and most approved nosology includes seven principal diseases of the zymotic class and eleven others less common: smallpox, measles, scarlet fever, diphtheria, croup, whooping cough, continued fever (including typhus, typhoid, and simple continued fever), quinsy, erysipelas, puerperal fever, carbuncle, influenza, dysentery, diarrhœa, cholera, ague, remittent fever, and rheumatism.—The reports of the registrar general of England show that more than one fifth of the whole number of deaths is from zymotic disorders. An examination of the returns of the surgeon general and of the marine hospital bureau, as well as the health reports from the principal cities in the United States, will establish about the same ratio. This immense mortality, in view of the fact that all zymotic diseases are preventible, enforces the necessity of sanitary precautions.

THE END.

SUPPLEMENT TO VOLUME XVI.

UTAH, a territory of the United States, bounded N. by Idaho and Wyoming, E. by Colorado, S. by Arizona, and W. by Nevada; area, 82,190 sq. m. The population in 1880 was 143,963, of whom 74,519 were males, 69,454 females, 99,969 natives, 43,994 foreign, 142,423 whites, 232 colored, 501 Chinese, and 807 Indians. The chief agricultural productions were 217,140 bushels of barley, 163,342 of corn, 418,082 of oats, 9,605 of rye, 1,169,199 of wheat, 92,735 tons of hay, 573,595 bushels of potatoes; number of horses, 38,131; 2,898 mules and asses, 3,968 working oxen, 32,768 milch cows, 58,680 other cattle, 233,121 sheep, 17,193 swine; value of manufactures, $4,324,992; gold mined, $291,587; silver, $4,743,087; assessed value of property, $24,775,279. There were 383 public schools; expended for school purposes, $170,887; pupils enrolled, 25,792; average attendance, 17,513.—The following table exhibits the mileage of railroads in the territory at the beginning of 1882.

COMPANIES.	Miles.
Central Pacific	163
Denver and Rio Grande (West division)	100
Echo and Park City	88
San Pete valley	30
Union Pacific	105
Utah Central	280
Utah Eastern	16
Utah and Nevada	87
Utah and Northern	80
Utah and Pleasant valley	60
Total	908

—Women have the right of suffrage in Utah on the same conditions as men. A recent act of congress prohibits polygamists from voting or holding office.—By the census of 1880, Salt Lake City had 20,768 inhabitants, and Ogden 6,069. See map in supplement to Volume III.

VENUS, Transit of. The transit of Venus on Dec. 8, 1874, was elaborately observed by astronomers of all nations. The English, Germans, Russians, French, and Americans in particular spent much time in preparing for these expeditions, and sent observers to all parts of the world where the phenomenon was visible (eastern and southern Asia, Australia, New Zealand, &c.). A new method of observation was tried, which it was hoped would lead to valuable results. This consisted in photographing the sun with Venus projected upon its disk. The negatives could be taken quite rapidly at the station, and carried home for careful measurements of the relative positions of the centres of Venus and the sun. Such measures could be made at leisure, with delicate apparatus, and repeated as often as desired. The former methods of observation by the eye were also used. These consisted in noting the time when the edges of the disk of Venus had each of the four positions A, B, C, D, fig. 1, with reference to the disk of the sun. The times of these contacts (so called), with the geographical latitude and longitude of the observer, give data by means of which the solar parallax can be deduced. For an observer in the southern hemisphere, Venus would appear to traverse the sun along the upper line in the figure, and the lower line is the path (in 1874) for a northern station. The distance between these paths, or the parallactic displacement of Venus, is a function of the solar parallax. The Germans and Russians employed heliometers in making measures (at definite times) of the relative positions of the centres of Venus and the sun. All the parties observed contacts. Photographs were taken by some of the parties of each nation. The method of photographing used by the English,

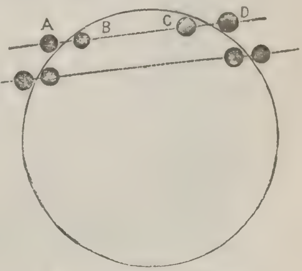


Fig. 1.—Transit of Venus.

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French, Russians, and Germans was to employ a short equatorially mounted refracting telescope, directed at the sun, with the negative plate in its focus. The image of the sun which was directly formed on this plate was too small for accurate measures with the engines which could be constructed, since an error of $\frac{1}{10,000}$ of an inch in the measures would produce a serious error in the resulting distance. Hence this solar image was enlarged by interposing a magnifying lens between the object glass of the telescope and the negative plate. Of course, any distortions of the resulting photograph produced by this enlarging lens would be reproduced in the negative. For this reason the American transit of Venus commission decided to employ another method, whose operation will be understood from fig. 2. This was also used by some of the French parties, and by a party fitted out at the private expense of Lord Lindsay, M. P., which was stationed at Mauritius. This "horizontal photoheliograph" is essentially a long horizontal telescope, with no tube. The object glass is on the right-hand cast-iron pillar; the focus of the telescope is at the negative plate-holder on the other pillar. The distance between these was about 36 ft., and therefore the image of the sun was about 4 in. in diameter; that is, supposing that the final measures could be made on the plate to $\frac{1}{25,000}$ of an inch, the determination of the parallax would have a rather less probable error in this method than in methods previously employed. The rays of the sun were thrown horizontally into this telescope by a plane glass reflector, which was made to follow the sun in its diurnal motion by a clock-work attachment mounted on a tripod. In practice, a photographic dark room was built over the plate-holder pier. In this way all tremors, &c., were avoided, and the primitive image of the sun was large enough not to require the interposition of an enlarging lens with unknown errors. This apparatus avoids the theoretical errors of the others, and is in this respect satisfactory. It has applications to the photography of stars, clusters, &c.—The United States sent eight parties. Prof. Hall, U. S. naval observatory, was stationed at Vladivostok, Siberia; Prof. Watson, Ann Arbor observatory, at Peking, China; Prof. Davidson, U. S. coast survey, at Nagasaki, Japan; Commander Ryan, U. S. navy, at Kerguelen island; Prof. Harkness, U. S. naval observatory, at Hobarton, Tasmania; Prof. C. H. F. Peters, Hamilton college, at Queenstown, New Zealand; Mr. Edwin Smith, U. S. coast survey, at Chatham island; Capt. Raymond, U. S. engineer corps, at Campbelltown, Tasmania. The weather was not entirely favorable at any station. Some photographs were taken at every station, but the full number at none. At Peking all four contacts were observed, but at no other station. Observations were made by the observers of other nations all over the area in which the transit was visible. The total number of photographs of the transit of 1874, taken with the above described apparatus, was 213, and from these Mr. Todd has deduced a parallax of 8·883″ ±0·034″, corresponding to a mean distance of almost exactly 92,000,000 miles. Mr. Todd

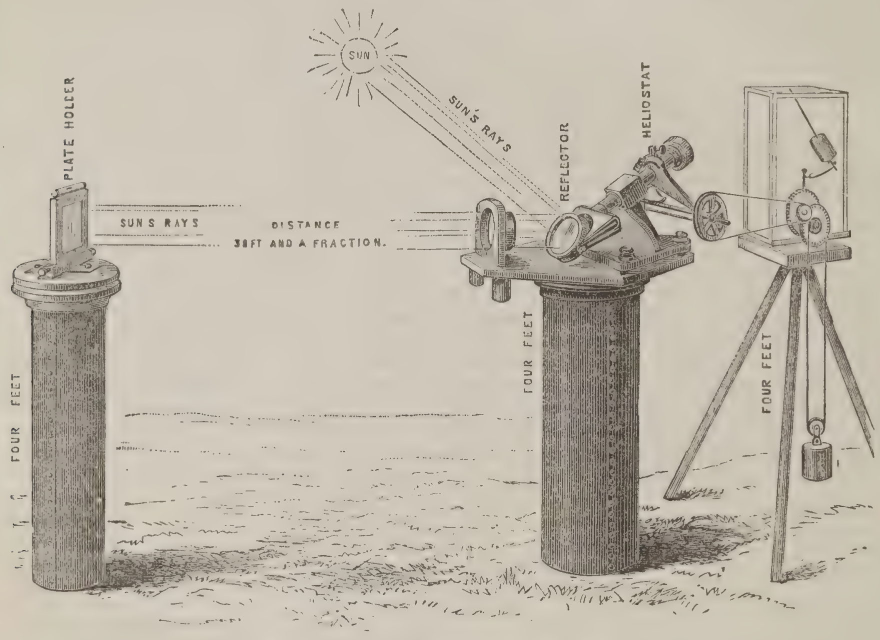

Fig. 2.—Method of Photographing the Transit.

finds for a probable error of a single photograph in distance 0·88″, and in position angle 3′ 45″. The results obtained by this American system appear to have been the best of any, the English method of photography having failed to give any trustworthy result in the hands of English observers. Nevertheless, the confidence of observers, even in the American method, cannot be said to be absolute, although the results obtained in 1874 determined the United States to use it again in 1883; employing, however, dry plates instead of wet. This method, indeed, presupposes the use of an absolutely plane reflecting mirror, and Prof. Young has shown that the effect of the solar heat, in "buckling" the mirror so as to make it convex, is apt to be very considerable. The governments of the world occupied numerous stations on the 6th of December, 1882, England taking 9, each supplied with two 6-inch refracting telescopes; France 8, supplied with telescopes of 8½ and 6 inches, and the United States 8 (abroad, New Zealand, Patagonia, Chili, Cape of Good Hope; and, at home, Texas, Florida, New Mexico, and Washington); besides numerous private ones all over the United States and territories, through the whole eastern part of which both the beginning and the end were visible. The German government had two stations in this country, one at Hartford, Conn., and one in Aiken, S. C., and both were supplied with heliometers. The weather was not good in Europe, where indeed only the beginning of the transit was visible, but it was favorable at nearly all the more important stations we have named. It is too soon, at the time of the present writing, to learn any new results as to the solar parallax; but we may give some physical observations, interesting because there will be no opportunity to repeat them for over a century. Jannsen, observing under favorable circumstances with the spectroscope, was unable to distinguish any lines due to the atmosphere of the planet. Prof. Young (whose authority is of the highest in such matters) was more successful, finding "the water lines between and near the two D's were distinctly and obviously, though not conspicuously, strengthened." This implies the existence of aqueous vapor in the planet's atmosphere. The atmosphere of Venus has been seen by numerous observers, in previous transits, as a thin line of light rimming the external part of the planet's disk, when it was partly entered on the sun; but, on December 6th, an extension of this phenomenon was noticed, which is so strange that strong testimony is needed to convince us of its reality. This testimony, however, we appear to possess, quite independent observers having described an eccentric spot of light, forming a kind of swelling or protuberance on this ring, and, according to several of these observers, extending inward upon the body of the planet. It was thus seen by Prof. Langley, of the Allegheny observatory, who describes it as conspicuously on one side of the line joining the centres of the sun and Venus, brightest on the outside, where it extended through some 30° of the circumference, and apparently extending inward. Its pale luminosity faded out at a distance of about one fourth of the radius from the edge.—The rapid increase of the accuracy of other means of ascertaining the solar parallax, and the peculiar difficulties attending on this, is likely, if it continue, to render the method by transit of Venus of little relative value, and it seems probable that this will be the last to excite such general attention among astronomers.—It may be remarked, in connection with the subject of the planet's physical features, that Mr. Denning's recent observations on Venus appear to establish the existence of the spots described by Bianchini and the older observers, and to confirm the statement that its true time of rotation is a little less than 24 hours.

VERMONT. The population of the state in 1880 was 332,286, of whom 166,887 were males, 165,399 females, 291,327 native, 40,959 foreign, 331,218 whites, 1,057 colored, and 11 Indians. The chief agricultural productions were 267,265 bushels of barley, 356,618 of buckwheat, 2,014,271 of corn, 3,742,282 of oats, 71,733 of rye, 337,257 of wheat, 1,051,183 tons of hay, 109,350 pounds of hops, 131,432 of tobacco, 4,438,172 bushels of potatoes; number of horses, 75,215; 18,868 working oxen, 217,033 milch cows, 167,204 other cattle, 439,870 sheep, 76,384 swine; value of manufactures, $31,354,366; copper ingots produced, 2,647,894 pounds. The following is an abstract of the report of the auditor, covering the transactions for the two years ending July 31, 1882: The orders drawn at the auditor's office for the year ending July 31, 1881, amount to the sum of $277,585 24, and to $280,619 38 for the year ending July 31, 1882. The orders drawn at the offices of the county clerks amount for the year ending July 31, 1881, to $43,714 88, and to $39,968 29 for the year ending July 31, 1882. The change in the method of accounting for fines and costs by requiring from each justice a sworn statement of all business done and the disposition of each case, before the allowance of bills, with other legislative acts of the last session, has wrought a great saving to the state. The comparative table given below shows the fines and costs collected biennially for the past three terms by the various justice and municipal courts:

TERMS.	Court orders.	Net court expenses.	Fines and costs collected.
Term ending 1878 ..	$165.822 73	$223,886 89	$25,583 76
Term ending 1880 ..	135,379 97	176.565 84	45,007 18
Term ending 1882 ..	83,683 17	93,728 76	66,576 47

This table shows the fines and costs collected in each year, for the last two years, to be about $17,000 more than for years preceding. Probate returns for the past two years show a net excess of probate fees of $109, against a net deficit of $1,200 in former terms. The figures of the second appraisal of the real and personal estate, under the act to equalize taxation, passed in 1880, proves the measure to be an unqualified success in its general results. The valuation for 1882 of the taxable property and polls in the state is as follows:

Amount of real estate	$106,577,559
Amount of personal estate	46,996,584
Total valuation	$153,573,584

One per cent. of this valuation is taken as a basis for assessing taxes, which, reduced, makes a grand list of $1,535,735 84. To this add 73,757 polls at $2, less deductions, and we have a list aggregating $1,680,529 84. A comparison of the grand lists for 1881 and 1882 shows the increase of the real-estate valuation of the latter year over the previous year to be $4,140,457. On personal property the increased valuation is about $100,000. The direct taxes for the past two years were $479,097.—The whole number of depositors in the savings banks and trust companies, on the 30th of June, 1882, was 42,583, an increase during the year of 4,204. The deposits aggregated $12,675,269 71, an increase of $2,015,784 59 since the report of 1881. Of the deposits, $10,221,178 52 belong to depositors living in Vermont, and $2,454,091 19 to non-residents. The average amount to the credit of each depositor is $297 66. There are 27,996 depositors having less than $250 on deposit; 373 depositors have over $2,000 each to their credit. The present undivided earnings, interest, and surplus held by all these banks amount to $439,624 21, an increase of $105,695 41. The number of savings banks and trust companies in the state is 22; their total expenses for the year were $112,876 75; the amount of United States taxes paid on deposits was $14,056 28; state tax, $53,681 12. Omitting all payments on account of loans, savings-bank tax, United States deposit, soldiers' and trust funds, that are not taken into account as a part of the current expenses of the state, the disbursements for the two years ending Aug. 1, 1822, were $719,171. The financial condition of the state, as shown by the treasurer's report, is as follows:

LIABILITIES.

Due towns, United States surplus fund	$13,397 62
Due soldiers' account	8,959 02
Due suspense account (outstanding checks)	1,940 24
Due bonds and coupons due 1876	4,360 00
Due towns on account of savings-bank tax	42,760 36
Due agricultural college fund due 1890	135,500 00
Due orders not presented	2,666 55
Total	$209,583 79

ASSETS.

Cash and deposits	$126,118 66
Uncollected taxes	218 94
Due from savings banks	28,167 63
Total	$154,505 23

The following table shows the acreage and average valuation per acre of the farms (exceeding ten acres) in each county, the appraised valuation thereof as equalized by the state board, and the aggregate valuation of all real estate for purposes of taxation (except road beds of railways) for 1882:

COUNTIES.	Acreage of farms over ten acres.	Average value per acre.	Total appraised value.	Total real-estate value.
Addison	428,384	$16 25	$6,964.011	$8,572,328
Bennington	375,951	9 33	3,509.642	5,509,961
Caledonia	342,858	13 81	4,735,773	7,174.606
Chittenden	297,892	20 42	5,825,458	11,226,471
Essex	254,835	5 00	1,274,621	1,713,905
Franklin	347,477	15 87	5,515.353	7,976,071
Grand Isle	48,163	22 79	1,097,585	1.201,272
Lamoille	243.374	11 61	2,826,464	3,280,390
Orange	389,072	13 78	5,363,078	6.979,939
Orleans	399,616	11 72	4,684,743	5,879,162
Rutland	524,314	14 83	7.777,986	15.562.026
Washington	387,337	14 53	5,626,733	8,747,752
Windham	449,192	10 37	4,657,577	8.566,196
Windsor	549,376	13 72	6,920,421	10,318,340
Total	5,037,841	.....	46,779,445	102,708,419

—In 1880 there were 142 convicts in the state prison; in 1882 the number was 94. On the 31st of July, 1880, there were 66 prisoners in the house of correction and four in the Rutland county jail. Two years later there were 44 prisoners in the house of correction and one in the Rutland county jail. On July 31, 1880, there were 122 pupils in the reform school; on the same day in 1882 there were but 86; the number of inmates of the insane asylum at Brattleboro, Aug. 1, 1882, was 441, of whom 356 were residents of Vermont, an increase of 27 within two years. Many beneficiaries are supported by the state in institutions outside of its borders.—The superintendent of education, in his report for March 31, 1882, says the common schools are not now accomplishing what the best interests of the people and state demand. Among the causes he cites the following: that the number of native-born children has decreased; that the people have gathered around business centres, and that many rural districts are thinly populated; that schools are small, pupils young, real estate depreciated, taxes high, and the tendency of the times is to employ cheap teachers; that school houses are neglected, and that the work of the district schools is unsatisfactory. In 1857 there were but 4 graded schools and 70 academies in the state. Since then the academies have decreased and graded schools increased. The state normal school at Castleton reports an aggregate attendance for the year of 396 pupils and 13 graduates; and the normal school at Johnson 122 different students, and the aggregate number of graduates since 1867 to be 262. The Randolph normal school had 187 students at the spring term of 1882, and graduated a class of 20.—The population of the principal places, by the census of 1880, was: Rutland, 12,149; Burlington, 11,365; St. Albans, 7,193; Bennington, 6,333; Brattleboro, 5,880; St. Johnsbury, 5,800; Colchester, 4,421; Montpelier, 3,219. See map in supplement to Volume V.

VIBERT, Jehan Georges, a French painter, born in Paris in 1840. He was a pupil of Barrias, and made his first exhibit at the salon in 1863. During the siege of Paris he belonged to the sharpshooters, and was wounded at the combat of Malmaison in October, 1870. His paintings are noted for exquisite finish, delicacy of touch, and fine coloring. His "Committee on Moral Books" was sold in New York in 1878 for $4,100. He has exhibited "Gulliver fastened to the Ground and surrounded by the Army," "The Importunate," "The Departure of the Bridegrooms," "The First Born," "The Reprimand," "A Monk gathering Radishes," "The Grasshopper and the Ant," "The Repose of the Painter," "The Antechamber of Milord," "The New Clerk," "The Serenade," and "The Apotheosis of Thiers." In addition to these Vibert has painted more than 100 easel pictures, and an "Assumption of the Virgin" for the chapel of St. Denis. The following works by him have been exhibited in the various loan collections of paintings in New York: "The Servant Reading," "The Knife Grinder," "The Offer of an Umbrella," "The Chatelaine," "The New Clerk," "The Painter's Rest," "The Sentinel," and "The Roman Censor." He has written a vaudeville, *La Tribune méchanique;* two comic scenes for acting, *Les Chapeaux* and *Les Portraits;* and a comedy, *Le Verglas.*

VIRGINIA. The population of the state in 1880 was 1,512,565, of whom 745,589 were males, 766,976 females, 1,497,869 natives, 14,696 foreign, 880,858 whites, 631,616 colored, 6 Chinese, 85 Indians. The chief agricultural productions were 14,223 bushels of barley, 136,004 of buckwheat, 29,119,761 of corn, 5,333,181 of oats, 324,431 of rye, 7,826,174 of wheat, 287,255 tons of hay, 19,595 bales of cotton, 79,988,868 lbs. of tobacco, 2,016,766 bushels of Irish and 1,901,521 of sweet potatoes; number of horses, 218,838; 33,598 mules and asses, 54,709 working oxen, 243,061 milch cows, 388,414 other cattle, 497,289 sheep, 956,451 swine; value of manufactures, $51,780,992; tons of coal mined, 43,120; iron ore, 169,683; lead ore, 11,200; zinc ore, 10,448; value of fishery products, $3,124,444. There were 4,876 public schools, including 1,256 for colored children; expended for school purposes, $889,862; pupils enrolled, 220,733, of whom 68,278 were colored; average attendance, 129,006.—The question of the state debt has been the chief issue before the people in recent years. The democratic party divided on this question, the majority forming what was known as the "Debt-payers'" organization, and the rest the "Readjuster" organization. Neither favored the payment of the entire debt, but the Readjusters offered less favorable terms to the bondholders. This organization, receiving the support of the bulk of the republicans of the state, gained the ascendancy, and in 1882 passed the so-called "Riddleberger bill" or "debt bill," entitled "An act to ascertain and declare Virginia's equitable share of the debt created before and existing at the time of the partition of her territory and resources, and to provide for the issuance of bonds covering the same, and the regular and prompt payment of interest thereon." The following is the Readjuster theory of the bill: The preamble presents "the true state of the account between the state and her creditors," derived from the second auditor's office, and fixes the debt, principal and interest, June 20, 1863—the date at which West Virginia was admitted into the Union—at $39,095,928 99, of which two thirds (one third being assigned to West Virginia) is $26,063,952 68, subject to a credit of $3,662,434 55 of interest paid from Jan. 1, 1861, to July 1, 1863, exclusively out of the revenues of this state, and leaving a principal debt of $22,094,141 96, with interest due to the sum of $307,376 17—total debt of *this* Virginia, July 1, 1863, $22,401,518 03. Following up the account upon this basis, and giving *this* state due credit for her redemptions and payments, the statement ascertains the true debt, as of July 1, 1882, at $16,843,034 17 of principal and $4,192,342 98 of interest—total, $21,035,377 15—which includes the literary fund. This sum is apportioned to the various outstanding bonds upon the basis of equity—in which each class is treated according to what it has heretofore received. Thus, that class which has received most now gets the least, and that which has received the least now gets the most. Under the scheme the different classes are fundable in the new bonds proposed to be issued as follows: Consols at 53 per cent. of their face, and the past-due and unpaid interest thereon at 100 per cent.; 10-40's at 60 per cent., and the past-due and unpaid interest thereon at 100 per cent.; peelers at 69 per cent., and the accrued interest thereon at 80 per cent.; unfunded bonds at 69 per cent. of two thirds of their face, with the unpaid interest thereon at 63; and the equitable share of the state of the bonds of the literary fund at 69 per cent., the interest in arrears on such share, $379,270, to be paid in money. For all balances of such indebtedness as may constitute the share of West Virginia, certificates are to issue, without recourse on this state. The bonds are to issue of the date of July 1, 1882, payable on July 1, 1932, or after July 1, 1900, at the option of the state, and are to bear 3 per cent. interest. The coupons of the coupon bonds are not tax-receivable, nor are they, or any of the bonds, exempt from taxation. In 1890, and annually thereafter until all the bonds are paid, 2½ per cent. of the amount of the bonds outstanding shall be paid into the treasury to the credit of the sinking fund, to be applied to the redemption or purchase of the bonds. Fiduciaries may exchange state bonds held by them for bonds issued under the act, when so authorized by any court having jurisdiction. Interest is to be paid as it becomes due out of any money in the treasury not otherwise appropriated.—According to the United States census of 1880, the assessed value of property was $308,455,135; total taxation, $4,642,202, viz.: state, $1,918,492; county, $1,170,413; town, city, &c., $1,553,297; state debt, $29,345,226; county debt, $1,283,574; town, city, &c., debt, $11,471,002.—The board of public works fixed the tax on railroads for the year 1882 at $138,454 92.—The Virginia penitentiary has within its walls and on public works 977 convicts, an increase of 29 during 1882. During the fiscal year 330 criminals were received, 185 were discharged, 33 died, 73 were pardoned, and 19 escaped.—The manufacturing industries of Richmond comprise 710 establishments in operation, employing 15,813 hands, with invested capital amounting to $11,213,680. The sales of the products of these aggregated in 1882 $28,061,332. Large as these sales are, they fall short of 1881 by $4,741,424. The loss is chiefly in tobacco, which drops off $3,029,100, and there is a loss in other branches—of $403,203 in iron, of $434,725 in cigars and cigarettes, of $550,000 in pork-packing, and of $49,281 in flour. In other departments there has been steady growth in the number of operatives employed, capital invested, and in productions. The following is a statement of the exports of Richmond for 1881–'2:

EXPORTS.	1881.	1882.
Tobacco	$79,604	$259
Flour	1,651,084	949,027
Petroleum	17,000	39,315
Timber and lumber	54,904	44,688
Staves	15,212	53,027
Hoops	22,593	53,155
Lard	6,719	9,745
Coal (bituminous)	.....	3,822
Wheat	65,486	17,256
Cotton goods	1,436	3,965
Cotton to England on steamers from West Point	.....	1,062,500
Logs	.....	574
Hams	.....	625
Sundries	775	487
Totals	$1,914,813	$2,237,445

Total number of barrels of flour shipped to Brazil from Richmond during 1882	142,237
Total value of same	$949,027
Decrease in shipment of flour to Brazil as compared with 1881—number of barrels	81,259
Total number of vessels engaged in the flour trade with Brazil	44
Being a decrease of	29

During the year two barks and six steamships cleared from West Point (port of Richmond), carrying 50,288 barrels of flour to Brazil.—The peanut crop is important in many of the counties of tidewater Virginia, south of James river, and is attended with considerable profit. Virginia raises more than any other state, the crop being worth at least $500,000 (estimate of 1879). Lime or marl is indispensable to the successful cultivation of this crop. The sweet-potato crop is another important one in tidewater Virginia. The cultivation of this usually goes hand in hand with that of melons, the same kind of soil suiting each. Irish potatoes are not raised extensively in the state for market. They succeed admirably about the foot of the mountains and on the mountains, and do well in all the cooler sections of the state. In tidewater Virginia they can be raised early for market, and are shipped considerably from the vicinity of Norfolk. Grape culture and wine-making have assumed encouraging proportions in Virginia, and are on the increase, particularly in Piedmont Virginia, in Albemarle, Nelson, Prince William, Warren (in the valley), &c. A considerable quantity of wine has been made, of excellent quality, though the business is yet in its infancy. Cotton is taking hold and extending itself farther north in the counties south of James river, in tidewater.—The population of the principal places, by the census of 1880, was: Richmond, 63,600; Norfolk, 21,966; Petersburg, 21,656; Lynchburg, 15,959; Alexandria, 13,659; Portsmouth, 11,390; Danville, 7,526; Staunton, 6,664; Manchester, 5,729; Fredericksburg, 5,010; Winchester, 4,958. See map in supplement to Volume XIII.

WARD, Genevieve, an American actress, born in New York about 1853. In the earlier part of her career she sang successfully in Italian opera at Havana, under the name of Mme. Guerrabella. She made her début in England at the Theatre Royal, Manchester, in October, 1873, as Lady Macbeth; afterward appeared as Constance in "King John;" and during the same year played at the Theatre Royal, Dublin, in the principal parts of "Medea," "Lucrezia Borgia," "Adrienne Lecouvreur," "Actress of Padua," and "The Honeymoon." In March, 1874, she made her first appearance in London at the Adelphi, taking the double parts of Blanche de Valois and Unarita in "The Prayer in the Storm," which ran 160 nights. In October of the same year she appeared as Julia in "The Hunchback" at the Crystal Palace; in 1875, as Rebecca at Drury Lane, in "Despite the World" in Dundee, as Sappho in Dublin, and as Antigone at the Crystal Palace; in 1876, as Lady Macbeth at Drury Lane, and afterward in a series of matinées at the Gaiety theatre. In 1877 she went to Paris and studied with Regnier of the Comédie Française, appearing as Lady Macbeth at the Porte Saint-Martin, in Paul Lacroix's French translation. In the same year she played Queen Catharine at Manchester and Liverpool for 15 weeks; in March, 1878, appeared as Emilia in "Othello" at the Queen's theatre, London, and in August as Meg Merrilies in Dublin and Manchester. In the latter month she came to New York, where she played in her favorite rôles, but returned to England in April, 1879. In August of that year she opened the Lyceum theatre with "Zillah," which after a few nights was replaced by "Lucrezia Borgia," and that by "Forget-Me-Not," in which Miss Ward acted the part of Marquise de Mohrivart. In May, 1880, she nightly filled the Prince of Wales's theatre, playing

"Forget-Me-Not" and "L'Aventurière," the latter in French.

WASHINGTON, a territory of the United States, bounded N. by the strait of Juan de Fuca and British Columbia, E. by Idaho, S. by Oregon, and W. by the Pacific ocean and waters separating it from Vancouver island. Area, 66,880 sq. m. Capital, Olympia. The population in 1860 was 11,594; in 1870, 23,955; in 1880, 75,116, of whom 59,313 were native and 15,803 foreign born, 3,186 were Chinese and 4,405 civilized Indians. The population by counties in 1880 was as follows:

COUNTIES.	Population.	COUNTIES.	Population.
Chehalis	921	Pierce	3,319
Clallam	638	San Juan	948
Clarke	5,490	Skamania	809
Columbia	7,103	Snohomish	1,387
Cowlitz	2,062	Spokane	4,262
Island	1,087	Stevens	1,245
Jefferson	1,712	Thurston	3,270
King	6,910	Wahkiakum	1,598
Kitsap	1,738	Walla Walla	8,716
Klikitat	4,055	Whatcom	3,137
Lewis	2,600	Whitman	7,014
Mason	639	Yakima	2,811
Pacific	1,645		

In 1881 Garfield county was created from Columbia. The chief towns are: Olympia, with 1,232 inhabitants; Dayton, 996; Port Townsend, 917; Seattle, 3,533; Tacoma, 1,098; Vancouver City, 1,722; and Walla Walla, 3,588. The territory is free from debt. The following is a statement of the operations of the treasury from Oct. 1, 1879, to Oct. 1, 1881:

Aggregate receipts	$129,163 35	
Balance on hand	2,392 99	
		$131,566 88
Total disbursements		108,840 97
Aggregate balance		$22,715 91
Outstanding warrants unpaid	$497 04	
Interest unpaid	93	
		$497 97
Net balance in treasury		$22,217 94

The territorial auditor states the total assessed value and territorial tax levies to have been for two years:

Assessed value of all property, 1880	$23,708,587 00	
Territorial tax levy on all property, 1880		$71,127 25
Assessed on all property, 1881	25,786,415 00	
Territorial tax levy on all property, 1881		77,351 19
Total for two years	$49,495,002 00	$148,479 44

The auditor estimates the disbursements for the succeeding two years as follows:

Insane	$52,000 00
Prison	27,500 00
Prosecuting attorneys	9,000 00
Auditor and treasurer	6,000 00
Printing and advertising	6,000 00
University	3,000 00
Superintendent of public instruction	1,600 00
Library and librarian	1,600 00
Incidental expenses appropriations	10,000 00
Total	$116,700 00
Estimated receipts	$147,217 94
Estimated expenditures	116,700 00
Estimated balance	$30,517 94

—Fifty-two convicts were confined in the penitentiary at the close of 1881. The cost of their support was $25,012 05 for two years. The patients treated at the hospital for the insane from Aug. 16, 1880, to Aug. 15, 1881, numbered 130; and the cost of maintaining the institution and making all improvements for the two preceding years was $44,894 20. The following figures indicate by counties the assessment of 1881, as reported by the territorial auditor to the legislature:

COUNTIES.	1881.	COUNTIES.	1881.
Chehalis	$340,689	San Juan	$181,161
Clallam	130,581	Skamania	169,618
Clarke	1,235,262	Snohomish	868,668
Columbia	2,454,383	Spokan	1,144,024
Cowlitz	815,089	Stevens	164,719
Island	340,547	Thurston	1,800,148
Jefferson	569,128	Wahkiakum	259,728
King	2,454,706	Walla Walla	4,421,280
Kitsap	938,848	Whitman	2,884,738
Klikitat	821,837	Whatcom	681,424
Lewis	931,815	Yakima	1,019,349
Mason	226,565		
Pacific	333,703		$26,786,415
Pierce	1,663,452		

According to the census of 1880, the value of farms was $13,844,224; bushels of barley raised, 566,537; Indian corn, 39,183; oats, 1,571,706; wheat, 1,921,322; Irish potatoes, 1,035,177; hay, 106,819 tons; pounds of wool, 1,389,123; hops, 703,277; value of live stock, $4,852,307; number of horses, 45,848; working oxen, 3,821; milch cows, 27,622; other cattle, 103,111; sheep, 292,883; swine, 46,828; estimated value of all farm productions, $4,212,750; value of manufactures, $3,250,134; gold mined, $135,800; coal mined, 145,015 tons, most of which was produced by the Newcastle mine in King co., about 20 m. S. E. of Seattle. Shipments of coal from Seattle for ten years have been:

1871	4,918	1876	104,556
1872	14,830	1877	112,734
1873	13,572	1878	128,582
1874	9,027	1879	132,263
1875	70,157	1880	138,497

On Puget sound, besides smaller local mills, there are seven large export saw mills, as follows:

MILL.	Daily capacity.	Value.	No. of men.
	Feet.		
Tacoma	75,000	$75,000	100
Port Blakely	135,000	125,000	125
Port Madison	100,000	120,000	75
Port Gamble	200,000	200,000	175
Seabeck	50,000	75,000	40
Port Discovery	50,000	75,000	40
Utsalady	80,000	100,000	50
Total	690,000	$770,000	600

Besides these, there are two mills not in operation, one at Port Ludlow, capacity 125,000 ft. a day, and another at Freeport or Milton, capacity 40,000 ft. a day. During the last six months of 1881, 52 cargoes, valued at $380,688, were exported. This lumber was shipped to the Sandwich islands, Mexico, Australia, China, the South American states, and New Zealand. The trade is growing rapidly. Following is a statement of the ship-building business on Puget sound from 1870:

YEAR.	No. of vessels.	Tons register.	YEAR.	No. of vessels.	Tons register.
1870.......	8	535·67	1876......	16	3956·78
1871.......	7	2418·32	1877......	8	686·23
1872.......	9	820·15	1878......	16	1969·37
1873.......	9	1072·31	1879......	11	1332·83
1874.......	20	2035·81	1880.....	14	2430·38
1875.......	11	2090·52	1881......	17	3509·00

The mileage of railroads in the territory at the beginning of 1882 was as follows:

COMPANIES.	Miles.
Columbia and Puget sound	24
Northern Pacific....................................	335½
Olympia and Tenino	17
Oregon Railway and Navigation company..............	71
Walla Walla and Columbia river.....................	32
Total	479½

See map in supplement to Volume XV.

WAUGH, Edwin, an English poet, born at Rochdale, Jan. 29, 1818. He was educated at a commercial academy, and learned the trade of printing and bookselling, which he followed for ten years. After that he was for five years secretary of the Lancashire public school association, since which time he has devoted himself exclusively to literature. He has published two volumes of poems in the Lancashire dialect, and several volumes of tales with the titles "Tufts of Heather," "Lancashire Sketches," "Factory Folk during the Cotton Famine," "Rambles in the Lake Country," "Snowed Up," "Rambles and Reveries," "Sancho's Wallet," and "The Chimney Corner."

WEIR, Harrison William, an English artist, born in Lewes, May 5, 1824. In 1837 he was apprenticed to George Baxter to learn designing and engraving on wood, and color printing. In 1849 he was elected member of the new society of painters in water colors, having previously exhibited his work at the British institution. His first picture, "Dead Shot," was exhibited at the royal academy. He is best known by his pictures of birds, fruit, and animals. His illustrations have appeared in the "Illustrated London News," "Band of Hope Review," "Children's Friend," and many children's books. His works include "Poetry of Nature," "Funny Dogs with Funny Tales," and "The Adventures of a Bear."

WELLES, Gideon, an American statesman, born in Glastonbury, Conn., July 1, 1802, died in Hartford, Feb. 11, 1878. After studying for the bar, he became the editor and part proprietor of the Hartford "Times," to whose editorial columns he contributed for 30 years, although he retired from the responsible editorship in 1836. He was a member of the Connecticut legislature from 1827 to 1835, became comptroller of the state by the appointment of the legislature in 1835, and was elected to the same office in 1842 and 1843, after filling the position of postmaster of Hartford in the intervening years. In 1846 President Polk appointed him chief of a bureau in the navy department, which post he retained till 1849. Mr. Welles identified himself with the republican party from its first inception. In 1856 he was defeated as republican candidate for governor of Connecticut. President Lincoln appointed him secretary of the navy in March, 1861, and he remained at the head of the navy department until the close of President Johnson's administration, in 1869. While a member of the Connecticut legislature Mr. Welles strove to have the last remains of the puritan laws which had given that commonwealth an unenvied reputation expunged from the statute book, and vehemently opposed a proposed law to disallow the testimony of witnesses who did not believe in future rewards and punishments. Chiefly through his efforts, imprisonment for debt was abolished in the state. He was an ardent opponent of special and private legislation, and effected the organization of banking and other business interests in his native state under general laws. When called to the secretaryship of the navy, he found that there was not a single available war ship in the country. Vessels had to be purchased immediately from the merchant marine, and new ones ordered in haste from shipbuilders. The great expense incurred in building up the navy employed in the civil war subjected Mr. Welles to severe criticisms toward its close, though the harshest detractions uttered against him never impugned his honesty.

WELLESLEY COLLEGE, an institution of learning at Wellesley, Mass., 15 miles west of Boston, on the Boston and Albany railroad. It is exclusively for women, and was opened in September, 1875. The grounds comprise 300 acres, including a greenhouse, from which the students are supplied with flowers for their botanical researches, and a farm, which plays an important part in the economy of the institution. The drive from the porter's lodge to the main college building is over a smooth shaded avenue three fourths of a mile long. The building is 475 ft. in its extreme length, and 150 ft. wide at the wings; it is in the form of a double Latin cross, designed in the renaissance style, with a mansard roof, and embellished with towers, bay windows, porches, pavilions, and spires. It is of brick laid in black mortar, with plain trimmings of brown stone, and finished inside in western ash and black walnut. There is a spacious library containing nearly 20,000 volumes, open at all times for the use of the students, and a large sunny reading room supplied with newspapers and more than 100 American, English, French, and German periodicals. A large gymnasium promotes the health of the students, which is carefully studied in every way; applicants in delicate health are not received. It is proposed to begin each year with from 350 to 400 girls in robust health, and every means is taken to have them continue so. A study is made of ventilation, drainage, light, heat, diet, and exercise. To prevent all impurity in the drinking water, an artesian well has been driven. There is a resident lady physician at the college, and a nurse ready to take care of the sick. The hospital is made bright and cheery with open fires, and is so placed that, in case of contagious diseases, it can be shut off from the rest of the building. The spacious, lofty chapel, over the library, is handsomely furnished. The rooms are all carpeted and tastefully furnished, and divided into suites of two each, a parlor and bedroom for two students. All the regular students board in the college and aid in some of the lighter domestic work of the family, as the care of their own rooms, all the table work in the dining room, and washing the dishes. The care of the public portions of the building is divided among them. No cooking nor kitchen work is required of the students. This housework does not interfere with the hours of study, occupies but one hour daily, and is a great economy in the expenses of the college, as each ten girls save the wages, waste, and board of one servant; and they profit by it in the low rate for board and tuition, and by learning to take a practical part in systematic housekeeping. Both these objects the trustees had in view in devising this plan. The only time for examinations at the college is at the beginning of the collegiate year in September, when candidates must pass satisfactorily in the following studies: Latin grammar; Cæsar, Gallic War, books 1–4; Cicero, seven orations; Virgil, Æneid, books 1–6; Greek grammar; Xenophon, Anabasis, three books; Iliad, three books; arithmetic, including the metric system of weights and measures; algebra through involution, evolution, radicals, quadratic equations, ratio, proportion, arithmetical and geometrical progression; modern geography; Guyot's "Physical Geography," parts ii. and iii.; English grammar and English composition. Candidates will be admitted on the certificates of teachers who have prepared them. —Wellesley college was established to give to young women opportunities for a collegiate education fully equal to those provided for young men. It is arranged for collegiate methods of instruction only, and for courses of difficult study. Its leading object is to educate learned and useful teachers; hence it is necessary that there should be many different courses of study, as well as opportunities of varying these courses by means of elective studies. Seven courses have been established, from which the students are at liberty to select, viz.: the general college course; the course for honors in classics; the course for honors in mathematics; the course for honors in modern languages; the five years' musical course; the five years' art course; and the scientific course. The general college course is best adapted to the needs of the majority of students, and provides for instruction in Greek, Latin, mathematics, French, German, the physical and natural sciences, history, literature, logic, ethics, psychology, drawing, and elocution. The three honor courses are simply modifications of the general course. The five years' musical course was introduced in September, 1878, and proves popular and successful. No student taking any of the regular courses can pursue the study of music, because her time during the four years will be occupied with the prescribed collegiate studies. For this reason the trustees have established the musical course, the additional year of which will enable those who take it to graduate in any of the regular college courses, and acquire a scientific musical education. The branches taught are pianoforte and organ playing, solo singing, harmony, counterpoint and fugue, composition, and the theory, history, and æsthetics of music. The five years' art course was established for the same reason. The scientific course is arranged to meet the wants of teachers, to open the way for future special study, and to provide satisfactory preparation for those who intend to become physicians. It embraces the study of mathematics, chemistry, mineralogy, lithology, geology, botany, biology, physiology, physics, and astronomy, in addition to the English branches required in all the courses. The entrance examinations are the same as for the general college course, except that Greek is not required. French and German will be pur-

Wellesley College.

sued until the students are able to read ordinary scientific works in both languages.

WEST VIRGINIA. The population of the state in 1880 was 618,457, of whom 314,495 were males, 303,962 females, 600,192 natives, 18,265 foreign, 592,537 whites, 25,886 colored, 5 Chinese, 29 Indians. The chief agricultural productions were 285,298 bushels of buckwheat, 14,090,609 of corn, 1,908,505 of oats, 113,181 of rye, 4,001,711 of wheat, 232,338 tons of hay, 2,296,146 lbs. of tobacco, 1,398,539 bushels of Irish and 87,214 of sweet potatoes; number of horses, 126,143; 6,226 mules and asses, 12,643 working oxen, 156,956 milch cows, 288,845 other cattle, 674,769 sheep, 510,613 swine; value of manufactures, $22,867,126; tons of coal mined, 1,792,570; iron ore, 60,371.—A summary of the fiscal year ending Sept. 30, 1882, shows the following results:

Balance in treasury, Oct. 1, 1881	$256,300 82
Receipts from all sources during the year.	842,563 53
Making a total of	$1,098,864 35
The disbursements during the year ending Sept. 30, 1882	797,612 06
Leaving a balance at the end of the year 1882 of	$301,252 29

The balance in the general treasury is made up of the following funds:

State fund in treasury Oct. 1, 1882	$13,698 32
The general school fund	252,760 34
The school fund	34,793 63
Total	$301,252 29

The assessed value of the personal property in the state in 1871 was greater than in 1881 by more than $3,000,000, and the assessed value of the land in 1881 was greater than in 1871 by about $10,000,000—showing a net gain of about $7,000,000 on $136,000,000, or a little over 5 per cent. in ten years. These figures seem to indicate that the large immigration to this state in the last ten years has added nothing to the wealth in personal property. But the last census testifies to the large number of farms that have been opened and to the large increase of agricultural productions, and in the mining districts there is also a large increase of production. While the population has been increasing, the necessary expenses of government have also increased. In 1871 the appropriation for criminal charges was $24,000; in 1881 it was $55,000. In 1871 the appropriation for the insane was $31,000; in 1881 there was appropriated for like purposes $83,000.—The number in the insane hospital during the year was 642. The number in the deaf and dumb and blind asylum on Oct. 1, 1881, was as follows:

Deaf-mutes	87
Blind	33
Total	120
In attendance during year, deaf-mutes	89
In attendance during year, blind	36
Total	125

The number of prisoners in the penitentiary Oct. 1, 1882, was 185. The summary of the schools is as follows:

Number of children enrolled for 1882, between six and twelve years of age	216,598
Number of children enrolled between same ages for 1881	218,191
Increase for the year	3,407
Average daily attendance for the year	96,652
Increase over previous year	5,386
Total receipts for the teachers' and building fund, including balance on hand during the year	$988,620 08
Increase over previous year	$73,160 11
Total expenditures during the year	865,878 41
Increase over previous year	$106,353 16

—The population of the principal places, by the census of 1880, was: Wheeling, 30,737; Parkersburg, 6,582; Martinsburg, 6,335; Charleston, 4,192. See map in supplement to Volume XIII.

WHISTLER, James Abbott M'Neill, an American painter, born in Lowell, Mass., in 1834. He was taken when very young to Russia by his father, G. W. Whistler (see WHISTLER, p. 601), but returned to America at the age of 12, and was educated at West Point. In 1855 he went to England, but before settling permanently there studied two years in Paris under Gleyre. He has exhibited his works at the royal academy, the Dudley and Grosvenor galleries, the Paris salons, and at the Hague. His etchings meet with unqualified praise; the queen has a collection of them at Windsor castle, and another collection is in the British museum. His paintings are warmly praised by some, and severely criticised by others. Mr. Ruskin dealt so savagely with his "Nocturnes," &c., exhibited in 1877, that it affected the sale of his pictures, and he brought a suit against Mr. Ruskin, which resulted in his gaining one farthing damages and no costs. Mr. Whistler explains the meaning of "nocturne" as simply "an arrangement of lines, form, and color, with some incident or object of nature, in illustration of my theory." His works include "The Last of Old Westminster," "Westminster Bridge," "Wapping," "The Golden Screen," "Old Battersea Bridge," "The Little White Girl," "Symphony in White, No. 3," "Sea and Rain," "The Balcony," "A Portrait of Mr. Carlyle," and "Nocturnes," "Arrangements," "Symphonies," and "Variations" illustrating all varieties and combinations of color.

WHITTREDGE, Worthington, an American painter, born in Ohio in 1820. The greater part of his life to the age of 20 was spent in Cincinnati, first in mercantile pursuits and afterward as a portrait painter. In 1850 he went to Europe, and studied in the galleries of London and Paris. He lived three years in Düsseldorf, and studied there under Andreas Achenbach, later in Belgium and Holland, and finally in Rome, where he remained from 1855 to 1859; then he returned to America and settled in New York. In 1866 he made a sketching tour to the far west; one of the fruits of this trip is his "View of the Rocky Mountains from the River Platte." He was president of the national academy from 1874 to 1877. Mr. Whittredge is especially happy in dealing with forest scenes. His works include "Trout Brook at Milford," "Sangre del Cristo Mountains, Colorado," "Evening on the Delaware," "On the Hudson," "A House by the Sea," "Christmas Eve, Italy," "The Camp Meeting," "The Morning Stage," "After the Rain," "Autumn on the Delaware," "Morning in the Woods," "Evening in the Woods," "Paradise," "The Window," "A Hundred Years Ago," "The Pilgrims of St. Roche," "The New England Shore," and "On the Plains." He sent his "Old Hunting Ground" and "Rhode Island Coast" to the Paris exposition of 1867, and "A Forest Brook" and "The Platte River" to that of 1878.

WILHELMJ, August, a German violinist, born at Usingen, near Frankfort-on-the-Main, Sept. 21, 1845. His father, a barrister and doctor at law, is one of the largest wine-growers of the Rhine country. His mother was formerly a distinguished singer and pianist, a pupil of Chopin. Wilhelmj began the use of the violin at the age of four; at seven Henrietta Sontag predicted that he would be a "second Paganini;" at nine he appeared for the first time in public. In March, 1856, he played at a charity concert in the theatre at Wiesbaden, where he made a great sensation. But his father was bent upon his studying law, and it was only when Franz Liszt (the question having been submitted to him) declared that "he was born for music," that Dr. Wilhelmj permitted the boy to devote himself to the violin. Liszt went with Wilhelmj to Leipsic, in 1861, and placed him under the care of Ferdinand David, with whom he lived, enjoying the society of many distinguished musicians. He studied for three years at the Leipsic conservatory. David, who was the best pupil of Spohr, taught him the technique of the violin. In 1862 he gave a public performance of Ernst's "Concerto Pathétique," and in November of the same year he made his first appearance at the Leipsic Gewandhaus concerts, playing Joachim's "Hungarian Concerto." In 1865 he made a concert tour through Switzerland and Holland; and in 1866 he appeared at one of Alfred Mellon's Covent Garden concerts, where he took the London public by storm. In January, 1867, he made his début in Paris at one of Pasdeloup's concerts, and the next season he played in Italy. In 1868 he visited Russia, living while at St. Petersburg with Hector Berlioz. Then followed tours through Switzerland, France, Belgium, Great Britain, Ireland, North Germany, Sweden, Norway, and Denmark. He made his first appearance in New York, Sept. 26, 1878, and afterward made an extended tour through the United States. During June and July, 1880, he appeared at eight concerts in New York. In his concerts Wilhelmj uses a Stradivarius violin; for practice, an American instrument, made by Gemünder of Astoria. His compositions for the violin are written in a pure and elevated style, with a broad and fluent melody.

WISCONSIN. The population of the state in 1880 was 1,315,497, of whom 680,069 were males, 635,428 females, 910,072 natives, 405,425 foreign, 1,309,618 whites, 2,702 colored, 16 Chinese, and 3,161 Indians. The chief agricultural productions were 5,043,118 bushels of barley, 299,107 of buckwheat, 34,230,579 of corn, 32,905,320 of oats, 2,298,513 of rye, 24,884,689 of wheat, 1,896,969 tons of hay, 1,966,827 lbs. of hops, 10,608,423 of tobacco, 8,509,161 bushels of potatoes; number of horses, 352,428; 7,136 mules and asses, 28,762 working oxen, 478,374 milch cows, 622,005 other cattle, 1,336,807 sheep, 1,128,825 swine; value of manufactures, $128,255,480; tons of iron ore mined, 41,440; lead ore, 1,728; zinc ore, 4,617.—The cash in the treasury on Sept. 30, 1881, belonging to the general fund, was $287,953 32; the receipts of this fund for the fiscal year were $1,263,074 90, and the disbursements were $1,186,807 54, and the cash in the treasury Sept. 30, 1882, was $364,220 68. The receipts of the trust funds during the fiscal year were $1,060,954 31; the cash in the treasury Sept. 30, 1881, was $548,346 88; the disbursements from the trust funds during the fiscal year were $1,446,888 21, and the cash in the treasury Sept. 30, 1882, was $162,412 98. The receipts during the year for the school fund are given at $326,159 60, of which amount $130,000 was for United States bonds which had been called in during the year. The disbursements from this fund are reported at $470,961 12, all of which, except $387 62 refunded for overpayments, is invested in interest-bearing securities. The total amount of school fund now at interest is $2,805,278 23, and the cash balance belonging to the fund is $7,767 35. The school fund income during the year amounted to $197,333 30, of which amount $185,166 42 was apportioned to the counties. There was paid during the year $24,483 81 to the university fund, nearly all of which was in payment of interest-bearing securities falling due; and there was invested of this fund during the year, in United States bonds, the sum of $52,862 50. At the end of the fiscal year there was of this fund $228,438 83, all of which was at interest save $2,966 39 cash on hand. The agricultural college fund, which now inures to the benefit of the university, amounted on Sept. 30, 1882, to $279,689 84, of which $274,385 37 was bearing interest. The normal-school fund, on Sept. 30, 1882, amounted to $1,165,041 20, all of which save $17,969 62 was invested in interest-bearing securities. The income from the fund during the year was $85,594 98, all of which was disbursed for the benefit of the normal schools. The receipts of the drainage fund for the year were $85,012 93, almost entirely derived from the sale of lands, and the disbursements were $48,542 59. The receipts of the year ending Sept. 30, 1882, aggregated $2,324,029 21, and the disbursements, $2,633,695 75, a deficiency of $309,666 54. But there was a balance in the treasury, Sept. 30, 1881, of $836,300 20, covering the present deficit, and leaving a balance in the treasury, Sept. 30, 1882, of $526,633 26. The bonded debt of the state, created in 1861–'3, has now all been paid or converted into certificates of indebtedness to the trust funds, except $2,000, $1,000 of which falls due July 1, 1886; the other $1,000 July 1, 1888. The distribution of the debt, on Sept. 30, 1882, was as follows:

War bonds outstanding	$2,000 00
Certificates of indebtedness, school fund	1,562,700 00
Certificates of indebtedness, normal-school fund	515,700 00
Certificates of indebtedness, university fund	111,000 00
Certificates of indebtedness, agricultural college fund	60,600 00
Currency certificates	57 00
Total	$2,252,057 00

The total state tax levy for 1882 was $710,220 88. The sale of public lands during the fiscal year was 218,395·84 acres, at prices varying from 50 cents to $3 an acre. The report of the commissioners shows that there are now on hand nearly 1,000,000 acres of public lands; that there are nearly 240,000 acres not yet put in the market; and that there were selected during the year 67,000 acres, for which the state will soon receive patents.—The attendance at schools of pupils between the ages of 7 and 15 years is 87 per cent. of the whole number in the state between those ages. The total valuation of school property, including buildings, sites, libraries, &c., is $5,614,938. The total amount expended for public and private schools during the school year was $2,577,402. There were 948 students in attendance at the various normal schools during the year. There were 31 graduated and 61 licensed. The number of pupils enrolled in public schools in 1881 was 295,162; in private schools, 24,624. There were 120 high schools. The state university in 1882–'3 had 367 students.—At the close of the fiscal year there were confined in the state prison, at Waupun, 348 persons. The total cost of maintaining the prison for the year was $47,751 33, of which the prisoners' earnings furnished $31,129 30; receipts from visitors were $193 50, making the net cost to the state of supporting the institution, $16,428 53. The number of boys in attendance at the state industrial school, at Waukesha, on Sept. 30, 1882, was 299; average attendance during the year, 321. There were admitted during the year 95 boys, discharged 160. The whole number of patients who have received treatment at the state hospital for the insane, at Mendota, during the fiscal year, was 656. The number discharged recovered was 49; improved, 59; unimproved, 56. The total cost of this hospital for the year was $95,648 37, being a weekly cost per capita of $3 92. At the beginning of the year the northern hospital for the insane had under treatment 512 patients; admitted during the year, 225; total, 737. The cost of maintaining this hospital was $98,160 02, which is equal to a weekly cost per capita of $3 57. The whole number of pupils enrolled at the institution for the deaf and dumb, at Delavan, during the year, was 244; of these there were present Sept. 30, 1882, 182; average attendance during the year, 176. The total cost of supporting this institution for the year was $34,375 94, a weekly cost per capita of $3 86. At the institution for the blind, at Janesville, there were enrolled during the year 82 pupils, of whom there were present on the last day of the fiscal year 57; average attendance for the year, 63. The total cost of supporting this institution was $16,726 17, equal to a weekly cost per capita of $5 11.—The report of the insurance commissioner shows that for the year ending Dec. 31, 1881, the fire insurance companies had:

Risks written	$165,336,642
Premiums received	1,997,243
Losses paid	925,793

The life insurance companies doing business in the state reported for the year ending March 1, 1882:

Policies in force	$32,705,956
Premiums received	873,143
Losses paid	565,743

—The Wisconsin railroad earnings from June 30, 1881, to June 30, 1882, were $18,765,428 32, an increase of $3,287,255 71 for the year; being an average per mile of $5,639 16, an increase of earnings per mile of $824 25. The total cost of operating the railroads of the state was $10,276,746 45, leaving as net earnings $8,488,681 87; the operating expenses per mile were $3,088 24, and the net earnings per mile of operated road were $2,550 91. The total number of passengers carried was 3,611,973; equal to 162,231,759 passengers carried one mile, at an average cost per mile of a trifle less than 2·83 cents. There were 5,499,321 tons of freight carried, an equal of 813,414,402 tons carried one mile, and the average rate per mile on each ton carried was a little less than 1·61 cents, which is a decrease of ·07 of a cent a mile on each ton of freight carried.—The population of the principal places, by the census of 1880, was: Milwaukee, 115,587; Racine, 16,031; Oshkosh, 15,748; La Crosse, 14,505; Fond du Lac, 13,094; Madison, 10,324; Eau Claire, 10,119; Janesville, 9,018; Appleton, 8,005; Watertown, 7,883; Green Bay, 7,464; Sheboygan, 7,314. See map in supplement to Volume IX.

WOOD, Mrs. **Henry,** an English novelist, born in Worcestershire about 1820. She is a daughter of Mr. Price, a glove manufacturer at Worcester, and at an early age married Henry Wood, a shipping merchant. Her first novel, "Danebury House" (1860), won a prize of

£100 offered by the Scottish temperance league. Her subsequent works include "East Lynne" (1861); "The Channings" and "Mrs. Haliburton's Troubles" (1862); "William Allair," "The Shadow of Ashlydyat," and "Verner's Pride" (1863); "Lord Oakburn's Daughters," "Oswald Cray," and "Trevlyn Hold" (1864); "Mildred Arkell" (1865); "Elster's Folly" and "St. Martin's Eve" (1866); "A Life Secret" (1867); "Roland Yorke" (1869); "George Canterbury's Will" and "Bessy Rane" (1870); "Dene Hollow" (1871); "Within the Maze" (1872); "Master of Greylands" (1873); "Edina" (1876); and "Pomeroy Abbey" (1878). She has been for some time editor of "The Argosy" magazine.

WOOD, John George, an English naturalist, born in London in 1827. He was educated at Merton college, Oxford, graduating in 1848, and was attached to the anatomical museum in 1848–'50. He has published "Illustrated Natural History," "Common Objects of the Seashore," "Common British Moths," "Common British Beetles," "Sketches and Anecdotes of Animal Life," "My Feathered Friends," "Garden Friends and Foes," "Natural History of Man," "Glimpses into Pet-land," "Common Shells," "Homes without Hands," "Bible Animals," "Insects at Home," "Strange Dwellings," "Insects Abroad," "Out of Doors," "Common British Insects," "Trespassers," "Man and Beast, Here and Hereafter," "Nature's Teaching," "Lane and Field," "Field Naturalists' Hand-Book," in conjunction with Theodore Wood, and other works.

WRATISLAW, Albert Henry, an English scholar, born about 1820. He was educated at Christ's college, Cambridge, graduating in 1844, and became a fellow and tutor. His works include "Bohemian Poems, Ancient and Modern, translated from the Original Slavonic;" "The Queen's Court MSS., with other Ancient Bohemian Poems, translated from the Slavonic;" "Barabbas the Scapegoat," "Notes and Dissertations on the Difficulties in the Scriptures of the New Covenant," "Baron Wratislaw's Adventures, translated out of the Original Bohemian;" "Four Lectures on the Native Literature of Bohemia in the 14th Century," and "Biography of John Huss."

WYOMING, a territory of the United States, bounded N. by Montana, E. by Dakota and Nebraska, S. by Colorado and Utah, and W. by Utah, Idaho, and Montana; area, 97,575 sq. m. The population, by counties, in 1870 and 1880, was as follows:

COUNTIES.	1870.	1880.
Albany	2.021	4,626
Carbon	1,368	3,468
Crook (unorganized)	....	239
Johnson (formerly Pease)	....	637
Laramie	2,957	6,409
Sweetwater	1,916	2,561
Uinta	856	2,879
The territory	9,118	20,789

Of the population in 1880, 14,152 were males, 6,637 females, 14,939 natives, 5,850 foreign, 19,437 whites, 914 Chinese, and 438 negroes and Indians. The great interest of the territory is grazing. Coal-mining is also an important industry. In 1880 22,512 bushels of oats, 30,986 of potatoes, and 23,413 tons of hay were raised; value of farms, $835,895; of farm productions, $372,391; of live stock, $5,007,107; number of horses, 11,975; cattle, 278,073; sheep, 140,225; value of manufactures, $898,494; coal mined, 589,595 tons, valued at $1,080,451. The increase of property in the territory, as shown by valuation assessments, was more marked during the years 1880 and 1881 than at any former period. It also appears that during the year 1881 the increase of property was nearly double that of any year previous. The following figures are from the returns made by the several counties to the territorial board of equalization:

Valuation, equalized, 1878	$9,602,823 38
" " 1879	10,608,203 95
" " 1880	11,835,563 40
" " 1881	13,866,148 06

—the extra increase being chiefly due to improvements in location of herds in Johnson co., as the following will show: Equalized valuation of property in—

	1880.	1881.
Albany county	$2,507,590 26	$2.773.162 00
Carbon county	2,244,234 60	2,113,999 00
Johnson county		1,259,981 00
Laramie county	3,813,567 64	4,078,623 30
Sweetwater county	1,952,196 92	2,211,262 50
Uinta county	1,317,974 58	1,429,090 26
Total	$11,835,563 40	$13,866,118 06

The actual value of the property of the territory somewhat exceeds $20,000,000. The balance in the treasury Jan. 5, 1882, was $44,623 66. The amount of territorial indebtedness was $7,282 50, of which $6,855 81 was for the care of insane persons at the Iowa state hospital. The number of cattle returned by the assessors in 1881 was 386,081, as follows: Albany co., 58,855; Carbon, 66.139; Johnson, 67,351; Laramie, 141,630; Sweetwater, 40,204; Uinta, 11,902. The actual number was known to be much larger. The governor, at the beginning of 1882, estimated the number of cattle belonging to Wyoming to be 600,000; of sheep, 400,000; of horses 40,000; and the amount invested in the herds of the territory at $10,000,000 or $12,000,000. The amount of coal mined in the territory is about 300,000 tons per annum. In 1881 about 134,000 cattle were shipped from Wyoming. The whole number in the territory at the beginning of 1878 was not over 250,000. With reference to the agricultural resources of Wyoming, Gov. Hoyt, under date of November, 1881, says: "In view of the popular notion, so long entertained, that the Rocky Mountain region is one half rocks and the other half desert, it is not strange that people at the east are slow to believe that the possibilities of even a very limited agriculture are to be found in Wyoming. We have not less than 7,000,000 acres of cultivable lands in Wyoming. While irrigation is necessary, as a rule, to successful agriculture, the means of fulfilling this condition are found in the myriad streams, which furrow the surface of the territory in every direction. The soils of Wyoming are unsurpassed in fertility by even those of the great alluvial bottoms of the Mississippi valley. Although the average altitude of the territory is a little above that of the timber line in the Alps, and cannot perfect the tenderer of fruits, nor yet Indian corn, it can produce the cereals, grasses, and the small hardy fruits to perfection. Where the conditions are ordinarily favorable, the soil duly prepared, and irrigation faithfully attended to, the crops which are grown and ripened are marked by an unprecedented yield. During the past season great numbers of ranchmen, in all parts of the territory, have grown crops of potatoes and oats, while not a few have added a small field of wheat." In 1882 the number of schools was 55; teachers, 57; pupils, 2,544. At the beginning of that year there were 533 m. of railroad in the territory, viz.: Colorado Central, 8½; Oregon Short Line, 60; Union Pacific, 464½. Women have the right of suffrage on the same conditions as men. See map in supplement to Volume XV.

ZENANA (Pers., belonging to women), the part of a house in India to which the women are confined. A house there consists of rooms built around two square courts; those around the front one have windows and verandas on the street as well as on the court, are comfortably furnished, and are devoted to the men (*baboos*). The ground floor is used for storerooms, carriage houses, and servants' quarters. The rooms built around the back and smaller court constitute the zenana, and here a woman passes her entire life, only exchanging her father's for that of her husband. She is allowed to go out only on rare occasions, to worship some idol, or to visit her father's house; but then she is carried in a palanquin and thoroughly shut up, to avoid all possibility of seeing or being seen. Her part of the house has no windows, except barred openings on the court, so that she has no knowledge of the outside world, save perhaps that brought in by the barberess who comes every week to cut the toe and finger nails of the female part of the household, and to dye the fingers and feet with henna. The wife of the oldest inmate of the house rules over the zenana; her word is law, and her several daughters-in-law and granddaughters are obliged to render her implicit obedience. The little girls of the higher caste are considered quite disgraced if a husband has not been found for them when they have reached their tenth year; and they are sometimes married at six and placed under the tutelage of their mother-in-law, to be taught to cook in a manner satisfactory to the baboo. When the wife enters the zenana of her husband's family, a room is assigned to her. Its sole furniture is a light corded bedstead, which answers for couch, chair, table, and finally bier; a piece of matting for a bed, with a few hard pillows; a drinking cup; and a box with a lock in which to keep her jewels. Of these she has a profusion, as they constitute the chief part of her trousseau. She needs no roomy presses. Her one garment, the *sarree*, consists of a straight piece of cloth (the wedding one is of thin red silk) a yard wide and five or six yards long; this she drapes gracefully around her, beginning at the waist and ending over the right shoulder, where enough of it hangs to cover her face and head if it is necessary to conceal them with the *chuddah*. The texture of the sarree is usually so thin that she can see through it as through a veil. The first floor of the zenana is used for cooking and cow sheds, and here the young wife is housed when about to become a mother; for 28 days she lies with only a piece of matting between her and the mud floor, attended by a low-caste cooly woman, who acts as midwife. The misery of the Indian wife's life, with her daily routine of cooking, diversified by braiding her hair, is only exceeded by that of the widow, which is one of such martyrdom that one may almost doubt whether the English were merciful in abolishing suttee (the burning of the widow on the husband's pyre). These poor women, in addition to the drudgeries and indignities heaped upon them, are permitted to eat but once a day, while one day in the week they abstain absolutely from food and drink. The widow's sarree is of the coarsest cloth, her jewels are taken away from her, and she is not permitted to exercise her taste in arranging her hair.—Woman in India was completely shut in by caste, prejudice, and religious tenets, and was thought to be contaminated by the touch or presence of a Christian, until 1860, when a missionary's wife appealed to one of the more enlightened of the baboos, a former pupil, to allow her to visit his wife and initiate her into the mysteries of needlework. A pair of slippers was the means whereby the first step was accomplished. They were taken home by the baboo for the inspection of the women; superstition soon yielded to the interest and curiosity they excited, and the despised Christian woman was for the first time allowed to enter a zenana. Instruction in reading soon followed that in needlework, which was supplemented by the Bible, catechism, and hymns. To one after another of the houses the teacher was invited, until a demand came for more zenana visitors. Miss Harriet G. Brittan went out in 1862, and in her little book, "Kardoo," she shows what has been the life of these prisoners, who are for the most part beautiful, intelligent, kindly women of our own race. Now there are a thousand of them under instruction in Calcutta alone, and also many in Allahabad and elsewhere. The object of "the American Home" in Calcutta is threefold: a home for zenana teachers, a normal school, and an orphanage for homeless girls. There are also 25 day schools, from which a bullock cart is sent out every morning to collect the little pupils from the zenanas.

ZOLA, Émile, a French novelist, born in Paris, April 2, 1840. He received a liberal education, and was for several years in the employ of the publishing house of Hachette and co., but left it in 1865 to devote himself exclusively to authorship. He has written voluminously for newspapers, and has published the following novels: *Contes à Nénon* (1863); *La confession de Claude* (1865; *Le vœu d'une morte* (1866); *Les mystères de Marseille*, *Thérèse Raquin*, and *Manet* (1867); *Madeleine Férat* (1868); *Les Rougon-Macquart, histoire naturelle et sociale d'une famille sous le Second Empire* (called his "Human Comedy"), which consists of seven volumes, entitled *La fortune des Rougon*, *La curée*, *Le ventre de Paris*, *La conquête de Plassans*, *La faute de l'Abbé Mouret*, *Son Excellence Eugène Rougon*, and *L'Assommoir* (1874–'7); *Une page d'amour* (1878); and *Nana* (1880). He has also produced a comedy, entitled *Le bouton de rose*, which was played in Paris in 1878. His novels have been severely criticised as being immoral; but they are professedly designed to make vice odious by exhibiting it in its naked deformity and disastrous effects.

ZULULAND, The War in. The last conflict between the British and the Caffres of South Africa, the war of 1879 against the independent Zulu kingdom ruled by Ketchwayo or Cetywayo, situated north of Natal and east of the Transvaal, arose ostensibly out of an old territorial dispute between the Zulu nation and the Transvaal republic, which was assumed by the British government upon its arbitrary annexation of the Transvaal in 1877. The disputed lands were a district lying between the Pongolo and Buffalo rivers, near the Natal frontier. Boer farmers had settled in portions of this territory, on the authority of grants obtained from the government of the Transvaal or South African republic, which claimed dominion over it in virtue of an alleged cession made by the deceased king Panda. A commission of inquiry considered the claims of the Zulus to this district in July, 1878, and decided that they were well founded; but the final award, shaped by Sir Bartle Frere, the British high commissioner in Natal, while providing for a readjustment of the boundary, giving to the Zulus a nominal sovereignty over the greater part of the territory claimed, entirely defeated the decision of the commission by confirming the settlers in the possession of their farms, and proposed to establish a British resident in Zululand to protect them in their holdings, as well as to dictate reforms to Ketchwayo in the internal administration of his kingdom. The decision, accompanied with an ultimatum requiring the disbandment of the Zulu standing army, was announced in December, 1878. The English had often assumed a sort of protectorate over Zululand, which they based upon the part performed by Mr. (afterward Sir Theophilus) Shepstone as a representative of the British government at the installation of Ketchwayo as king in 1873. Anticipating war, Sir Bartle Frere had sent to England for reenforcements before the announcement of the ultimatum. The English forces within call at the time numbered not over 16,000 men, at least half of whom were native troops. Ketchwayo's army was upward of 40,000 strong, and was known to be well disciplined and courageous. The troops had been collected on the borders of Zululand. Receiving no answer from Ketchwayo before the lapse of the thirty days prescribed in the ultimatum, the high commissioner in the beginning of January, 1879, gave instructions to Lieut. Gen. Lord Chelmsford to invade Zululand, delegating to him the conduct of the war with full liberty of action. A scheme for a South African confederation, similar to the Canadian, to embrace all the British and Dutch settlements in South Africa, had been officially entertained since 1875, in which year it was announced at the Cape by order of Lord Carnarvon, the secretary of state. This scheme was strongly disapproved of by the Cape Colonists, who objected to undertaking the charge of defending the borders of the frontier colonies. It was still less acceptable to the Boers of the Dutch republics. The confederation scheme had furnished the motive for the incorporation of the Transvaal state into the British empire, carried out by Sir Theophilus Shepstone in 1877 without the consent of the citizens. It afforded also the real ground for the invasion of Zululand and the suppression of Ketchwayo's kingdom. The destruction of the only formidable military power on the border, which the Transvaal Boers were powerless to keep in check, would, it was thought by the colonial administrators, render these contented with the involuntary loss of their independence, and at the same time remove the objections of the people of Cape Colony to the consolidation project. Sir Bartle Frere entered into the war without special authorization by the home government, and entirely without serious provocation on the part of the Zulu chief. The simple existence of an organized military force outside the colonial boundary justified the war in the view of a portion of the British public. An unsubstantiated rumor that Ketchwayo had put several young women to death for refusing to marry veteran warriors assigned to them, and reports of his inhospitality to missionaries, furnished additional grounds for the aggressive policy of demanding the disbandment of the Zulu army and placing the kingdom under the control of a British resident. The virtual refusal of his claims to the disputed lands, after they had been acknowledged by the English commission to whose arbitration he had voluntarily submitted them, might have incited Ketchwayo to take up arms later, although at the time of the British advance he had committed no open act of hostility. Immediate pretexts for hostilities were furnished by the failure of Ketchwayo to deliver up two sons of the chief Sirayo, who had pursued two eloping wives of their father into Natal, and had executed them after bringing them home, and by the detention for an hour or two by a party of Zulus of two English officers who were making a military reconnoissance over the boundary.—On Jan. 11 and 12, Lord Chelmsford moved his forces across the frontier at several points remote from each other. They were divided into five different columns. The first, under Col. Pearson, consisting of 1,500 infantry and 300 cavalry, four field pieces and one Gatling gun, with about 3,000 of the native contingent force, crossed the Tugela river near the seacoast, intending to advance upon Ekowe (otherwise Etchowe), about 30 m. within the Zulu boundary, on the road to Ketchwayo's capital. The second column, consisting entirely of native troops, under the command of Col. Durnford, was stationed on the border, about 40 m. from the mouth of the river, and was intended as a support to the advancing columns on the right and left. The third column, commanded by Col. Glyn, and accompanied by Lord Chelmsford and his staff, advanced over the Buffalo river at the ford called Rorke's Drift; it consisted of 1,500 infantry, 200 cavalry, six guns, and 400 natives. The fourth column, under Col. Evelyn Wood, which acted in combination with the preceding under the immediate directions of the commander-in-chief, numbered 2,278 officers and men of the imperial army, with six guns; it advanced from Utrecht to support the left flank of the headquarters column. The fifth column, under Col. Rowlands, protected the Transvaal frontier to the north. A simultaneous advance was made by the other four columns on the 11th, with the intention of combining the forces at Undini, the king's capital. The second and third columns joined forces, while Col. Wood advanced by the Blood river, and Col. Pearson, after an engagement with the enemy, marched upon Ekowe, where he fortified his camp. The Zulu soldiery were found to be much more efficient than had been expected, and Ketchwayo proved himself no indifferent strategist. Most of the Zulu warriors were armed simply with their national weapon, the assegai, a kind of short spear; but a part of the army was provided with breechloading rifles. They were finely disciplined, exceedingly brave, and versed in a savage method of tactics which answered well in their wild country. The leaders kept themselves perfectly informed of the movements of the British troops. The English commanders, on the other hand, by their incautious movements, their ignorance of the character of the country and the methods of their foes, and their failure through over-confidence to watch the enemy's movements and guard against surprises, allowed the savages to outgeneral them and win a victory at the outset of the campaign, which struck sorrow and consternation into the English nation, cost the invaders a considerable loss of life and military stores, thus seriously crippling the British armament, and led to subsequent military mistakes on the part of the commanders through exaggerating the might and prowess of the enemy as much as they had before underrated them. On Jan. 22, while encamped on the Bashee at the foot of the Isandlana (or Isandula) hill, the general sent forward a large part of his forces to assault a strong position where the enemy had shown themselves several miles from the camp. The commander and his staff, escorted by Col. Glyn's force, were about twelve miles away from the camp, in the direction of the intended action. A portion of the troops remained still at the camp at Rorke's Drift. The defence of the camp was left to Lieut. Col. Pulleine, with two battalions of the 24th regiment and some native troops. Col. Durnford arrived during the day at the camp from Rorke's Drift, and went out on an expedition against the Zulus, who were reported to be in force on the hills a few miles off. The main body of the Zulu army lay concealed in the hills near the camp. Col. Durnford first drew out their attack, which they developed rapidly and in excellent order. Col. Durnford retreated with his force in good order upon the camp. The camp was surrounded by the Zulus, who intrepidly advanced, though cut down rank after rank by the murderous fire of the troops, and at last, coming to a hand-to-hand conflict, captured the camp and stabbed all with their assegais except a very few who escaped by clambering down a precipice and crossing the river. By mere accident the commander-in-chief and his staff and Col. Glyn's command avoided the same fate: they were warned as they were returning by an officer who had ridden up to the camp and with difficulty escaped. If the simplest earthworks had been constructed, or the common precaution of parking and linking the wagons had been observed, the camp of Isandlana might have been saved, as Lieuts. Chard and Bromhead saved the camp at Rorke's Drift the same day with hasty intrenchments. The advance in Zululand was long deterred in consequence of this disaster. Reënforcements to the extent of between 8,000 and 9,000 men of all arms, with 1,800 horses, and cannon and Gatling guns, were immediately shipped from England. An appropriation of £1,500,000 was provisionally voted by parliament for carrying on the war. Loud complaints were made against the commander-in-chief, and he was subsequently superseded by Sir Garnet Wolseley, who was appointed governor of Natal and high commissioner of Southeast Africa, as well as commander of the forces; but he did not arrive to take command until the war was virtually ended by the capture of Ulundi. Col. Pearson and his command were provisioned in Ekowe for two months, where they were besieged by the Zulu army. Grave apprehensions were felt as to their safety before they were relieved. When Lord Chelmsford again continued his march into the interior, the army was reorganized into two divisions, the troops on the left bank of the lower Tugela being under the command of Maj. Gen. George Crealock, and those in the Utrecht district under Maj. Gen. Newdigate, Brig. Gen. Sir Evelyn Wood retaining the independent command of his flying column. Gen. Clifford was given charge of the defence and communications in Natal. Another reverse was suffered by the British in the slaughter of a detachment of soldiers while escorting a train of wagons at a point on the Intombi river, only a few miles from Luneburg, by a body of Caffres subject to the chief Umbelini. On April 2 an important victory was gained by Lord Chelmsford and Col. Wood at Gingholovo. The entire Zulu army attacked the camp, which was within sight of Ekowe, during four hours, and was driven back with terrible loss of life. The following day the beleaguered garrison was relieved. On June 1 Prince Louis Napoleon, son of the late emperor of France, who had gone to Zululand as a volunteer, and was attached, though not for active service, to the staff of the commander-in-chief, while accompanying Lieut. Carey, attended by six troopers, on a reconnoitring expedition, was killed in a sudden attack by the Zulus within less than a mile from the camp near the Hyotoyozi river. On July 4 Lord Chelmsford virtually put an end to the war by defeating the main body of the enemy in an open plain near the king's kraal at Ulundi. The Zulus, to the number of about 20,000, surrounded and attacked the English troops, numbering about 4,000, formed in a hollow square. The Zulus were unable to advance to a hand-to-hand conflict, owing to the destructive effect of the constant fire of musketry, cannon, and Gatling guns. In this last desperate engagement, Ketchwayo's army was so entirely cut to pieces that the Zulus abandoned all their positions and dispersed, after burning the royal kraal and the military kraals in the neighborhood. Soon afterward Gen. Sir Garnet Wolseley assumed the active command in the field. No organized resistance was subsequently offered by the Caffres, but desultory raids continued to be made by the Zulus until their king was taken prisoner, and by other tribes, particularly by the people of Secocoeni, an old enemy of the Boers. The Zulu king was supposed by the English to have incited the depredations of Secocoeni, to have stirred up the rebellion of the Galekas and Gaikas in the preceding year, and to have been the prime mover in all the other recent disturbances on the South African border. On Aug. 28 Ketchwayo was captured in the forest of Ngome by Major Marter, to whom he quietly surrendered himself. The ex-king was detained as a state prisoner at Cape Town. Secocoeni was subsequently taken prisoner, and by the end of the year the whole region was pacified.

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